

ALLAHABAD UNIVERSITY STUDIES

VOL X—(ARTS & SCIENCE) 1695-20

277-1-
102

EDITED BY

The Vice-Chancellor and the Heads of Departments



SENATE HOUSE
ALLAHABAD
1934

Price Rs 7 as 8

Printed by K. Mittra, at The Indian Press, Ltd., Allahabad

CONTENTS

Arts

	PAGE
SECTION I—PHILOSOPHY	1—140
1 Research Thesis on the Mystic Philosophy of Kabir—by O B L Kapoor	1—36
2 Avatāras of God—by S L Katre, M A	37—140
SECTION II—HISTORY	133—183
3 Relations of the East India Company with the Nawab Wazirs of Oudh, 1798—1805—by Suresh Chandra Mathur, M A	133—183
SECTION III—LAW	187—249
4 The Muslim Law of Inheritance—by M U S Jung, M A , LL D	187—249

Science

SECTION I—CHEMISTRY	253—343
1 Synthesis of Some Optically Active Coloured Compounds from l-Menthylhydrazine and Aromatic Aldehydes—by R K Kaul and Jamuna Datt Tewari	253—256
2 Formation of Organic Jellies (Part I)—by Satya Prakash	257—283
3 Induced oxidation of glucose in presence of Glutathione acting as an inductor—by Har-kumar Prasad Verma	285—288
4 Chemical Examination of the Seeds of <i>Abrus Precatorius</i> , Linn (Part II) The Colouring Matter of the Seed-Coat—by Narendranath Ghatak	289—295
5 Metallic Thorium as a Synthetic Reagent in Organic Chemistry—by Kedar Nath Gaud and Sikhi Bhushan Dutt ..	297—305

6	Presence of Formaldehyde in the Solar and Terrestrial Atmosphere and the Problem of "Carbon Assimilation" in the Plants—by Atma Ram	307—328
7	Photochemical Reduction of Carbonic Acid, Carbonates and Bicarbonates by Metals like Magnesium Iron, etc., and the Formaldehyde Theory of Photosynthesis—by Atma Ram	327—335
8	Induced and Photochemical Oxidation of Sodium Tartrate by Air—by C C Palit	337—343
SECTION II—ZOOLOGY		347—375
9	On the Cytoplasmic Inclusions in the Oogenesis of <i>Sciurus Palmarum</i> —by Miss R Clement MSc	347—375

Allahabad University Studies

VOL X

1933

NO 10

RESEARCH THESIS
ON
THE MYSTIC PHILOSOPHY OF KABIR

BY
O B L. KAPOOR,
*Research Scholar, Philosophy Department
University of Allahabad*

I THE THEOLOGY OF KABIR

A

The surest mark of a mystic is his intimacy with the Absolute Truth. This distinguishes him from the mere philosopher or the mere religionist. What the devotee worships or the philosopher fixes as his aim the mystic cherishes as the treasure of his heart. And this he proclaims to the world with his characteristic simplicity and outspokenness. The soul-inspiring verses of Kabir are a beautiful illustration of this. God is not for him a remote object—something which he pines for and achieves not. He is as close to him as his own heart.

The Eternal Purusha bade me sit by his side

—*Shabda*, 64

The Absolute is not for him an Ideal of Knowledge to be realised. It is the abode of Kabir and in It he is settled for ever.

There is one name fathomless and limitless,
There is settled Das Kabir

Fixed in God Kabir spies round him the rich, resplendent atmosphere of the transcendental region and tries to paint it in colours perceptible to our eyes. Like all poetry of mysticism the songs of Kabir have a double aspect. They are on the one hand a vision of reality and on the other a revealing of the secrets of Eternity to the ignorant. But such is the weakness of the human mind that it fails to comprehend his divine message. The whole and complete truth underlying his teaching is overshadowed by the prejudices and the fragmentary ideas of the critics who weigh his words on the tiny scales of their biased intellect.

So widely divergent are the views on the theology of Kabir that it becomes necessary to consider and examine each separately. But one thing, we may note at the outset, is quite certain about him, that he is preeminently a monotheist. Perhaps Kabir was the first saint in the religious history of India, who made a genuine attempt to bring about the unity of different religions, by proclaiming that, for all people of whatever caste or creed the God is one and the same. All are the children of the same Father and have to travel along the same road on their journey back to home —

There is one path for the Hindu and the Turk
This the Satguru has taught

—*Shabda*, 10

Different religions call Him by different names, but
He remains the same
Says Kabir, "listen O' Saints, call Him Ram or
Khuda. It is One "

—*Shabda*, 10

In *Shabda* 30 Kabir criticises Polytheism in most emphatic terms —

O! Brother, wherefrom came two different masters
of the world? What made you mad?

Allah, Ram, Karim, Keshava, Han and Hazarat are
only concocted names

Different ornaments are made of one substance—gold
But in all the nature is the same

Only in hearing and speech are two made Let us
wholeheartedly surrender ourselves to this One Let us
worship Him alone and none else For only the single-
minded devotion shall bear fruit and a wavering mind will
fall

If One is worshipped then all is gained, if all are
worshipped then the One is lost

—*Sakhi*, 275

Thus there can be no shadow of doubt that Kabir was a staunch enemy of Polytheism Let us now turn to consider in some detail the real nature of the God he cherished According to Macnicol Kabir believed in the Personality of God “Kabir’s essential doctrine,” he says, “was theistic and not pantheistic” The learned scholar Sir R G Bhandarkar also opines the same He states, “The religion which Kabir promulgated was a pure spiritual theism” Mr Westcott, another strong supporter of this view, says that the title *Muhavid*, or a believer in Personal God given to Kabir in *Dabistan* proves that he must have been a theist Many verses in the *Bijak* of Kabir lend support to this view More than often he speaks of God as *Sagun* or with qualities

The qualities of Ram are unique, unique, unique
How wouldst thou O! Man! know His qualities,
Kabir cries aloud

—*Shabda*, 18

His God is not the static, inactive Absolute of Vedanta. For He performs the supreme act of creating and preserving the universe and Kabir, calls Him (कर्ता) or The Creator —

They died who did not recognize the Creator
 Again, He is eulogised as the Supreme Artist —
 He is the real Artist who drew this picture
 Says Kabir, they are wise who behold the Painter
 —*Ramarni*, 26

We can get a vision of the Artist by rendering service to Him. Like the self-sufficient absolute of pure Monism He is not indifferent to our devotion but always stretches His helping hand and calls us to take shelter under Him. He is ever ready to respond to our earnest prayer and lead us into His transcendental region.

O' son, render service to Me. I shall give to thee the
 kingdom of gods
 From an inaccessible and insurmountable fortress I
 will release thee

—*Ramarni*, 58

Thus the qualities of God, His creation, His Grace and devotion give a thorough theistic colouring to the teaching of Kabir.

There is, however, another group of critics, which holds the opposite view that Kabir was not a Theist but a Pantheist. Rev Ahmad Shah is a staunch supporter of this view. "For Kabir," he says, "God is still the absolute, beyond all being, the one, Atit, Satya Purusha." The same view is corroborated in some of the recent writings on Kabir. Rev Keay in his book *Kabir and His Followers* remarks that the God of Kabir is a mere shadow. Mr. Ram Kumar Verma in his recently published book "कबीर का रहस्यवाद" writes

“ When the pitcher (sailing on water) breaks the two portions of water (the inside water and the outside water) combine into one. In the same way when the covering of Maya is removed the soul and the oversoul unite. Upon this philosophy of Advaitism is based the mysticism of Kabir ”

This account of Kabir's teaching may appear to be false in the light of the explanation given by Mr. Westcott, Macnicol and Bhandarkar, but the fact is that the utterances of Kabir very often have pantheistic import. He discards all differences and speaks of the unity of all existing things in the Absolute. The Absolute permeates everything.

He is Himself the God and the leaf that is offered
 He is family and He is caste
 He is all creation. He is the dweller in the world
 He is Himself the husband. He is the enjoyer of all
 happiness

—*Ramaini*, 14

We should not be deluded by the outward shape and form of things, because they all spring from the same source and are in essence one.

O ! Fools, in your quest you have gone astray
 Skin and bone, dung and urine are one
 From one drop the whole universe was created
 Then who is Brahman and who is Sudia ?

—*Shabda*, 75

In emphasising the unity of things Kabir sometimes goes to the extent of saying, that there is no difference even between the worshipper and the worshipped. The worship, the worshipper and the object of worship are one. In this state of things no real worship is possible.

Thou knowest me, and I know Thee I am merged in
Thee

When there is no creation, no destruction, upon whom
wouldst thou meditate?

—*Shabda*, 74

This oneness of all things is hidden from our view by
our ignorance, which makes the one appear as many

It is but one thing, and they make it many

A heavy curtain hangs between and therefore nothing
is seen

—*Sakhi*, 405

Kabir illustrates this by means of the analogy of the dog
and the mirrors which is commonly utilised by all
Vedantins to explain their doctrine

In a cave of mirrors entered a dog There at the
sight of his own image he barked and barked till
he died

—*Sakhi*, 59

When one sees his reflection in the mirror he is the
same in both

From this element comes that element, and that is the
same as this

—*Sakhi*, 60

We have only to lift the curtain of ignorance to see the
“Unity” or the Absolute He cannot be described by
words He is Infinite, Unconditioned and Unqualified

How can one describe the condition of the uncondi-
tioned who has no village or place?

He, Who is seen without qualities, by what name
should I call Him?

—*Ramain*, 7

Therefore Kabir declares that our finite understanding cannot grasp the real nature of the Absolute. His nature is known to Him alone.

Thou knowest thine own nature, Deva, in us there is
no power to know

—*Sakhi*, 378

We can describe Him only in negatives

He is neither stars, nor sun, nor moon

He is not born of the father's seed

He is neither water nor land, nor the still wind

We have now seen that the critics interpret the teaching of Kabir along two distinct lines. Some call him a theist while the others regard him to be, out and out, a pantheist. We have also seen that both the interpretations are equally possible. Both the schools find ample material in the *Bijak* for the justification of their views. But interpreted in this way the teaching of Kabir assumes a self-contradictory character in the eyes of an unbiased reader. Naturally, therefore, he makes a choice between the two views. And when he accepts one and rejects the other he finds it difficult to reconcile with his view those elements of Kabir's teaching which lend support to the opposite doctrine. The present section, however, is a bare statement of the difficulty. In the next we will try to show that the teaching of Kabir in its completeness transcends the contradictory views of these critics and in a higher synthesis unites them together.

B

If differences of opinion among the critics about a mystic and contradictory interpretations of his teaching be the mark of his greatness then there can be no doubt about the greatness of Kabir. It is the light, the richness and the wide range of the vision of Kabir that endear

him to the people of all caste and creed. Different schools of philosophy or religion flatter themselves with the belief that Kabir was their own. The theists and the pantheists alike hold that Kabir reiterated their views. The Hindus, the Muslims and the Christians equally claim that Kabir was a pioneer of their religion. It is now a common belief among scholars that Kabir owed a great deal to the Sufists and some of them are even bold enough to say that Shaikh Taqui, the Sufi saint, was his spiritual master. A more surprising thing to note is that Pt. Walji Bhai of the Irish Presbyterian Church has made an attempt to show that Kabir inherited his doctrine from the Jesuits. Amidst these startling conclusions it becomes difficult for an impartial reader to make up his mind about Kabir, and he begins to think that he was probably an unsystematic and eclectic thinker. But this doubt is hardly justified. The fact is that Kabir did not borrow his doctrine from any particular school nor did he try to combine in an incongruous manner what he found best in each. He was an original thinker and a true mystic and owed his knowledge neither to books nor to tradition but to his own mystic vision. And when he wanted to preach what he had realised he had to translate it into the language and the thought of the people amidst whom he lived. That is what makes Kabir appear by turns a Vedantist, Vaishnavite, Christian and Sufi. But none of these views singly exhausts the whole philosophy of Kabir. Each was taken up by him to express only a particular side of his vision. Kabir seldom exhibited any special love for originality. Following a method common among the mystics he gathered material from all possible quarters to express the inexpressible nature of the Almighty but confined himself particularly to none. Like the Quakers he had a frank dislike for all religious exclusivism, and said, "Kabir is on the road to God and

is marching on to his end forsaking all partial views " He is, as he says, " atonce the child of Allah and of Ram " They are, therefore, grossly mistaken, who call Kabir a pantheist or a theist, a Brahmin or a Sufi, a Vedantist or a Vaishnavite The mystic genius of Kabir does not submit itself to any such classification

Almost all the critics of Kabir forget his cosmopolitan spirit, the depth of his view, and the richness of his vision Each gets a glimpse of one side of the Truth, the rest is eclipsed by his own prejudices There are two important commentaries on Kabir—one by Rajah Vishvanath Singh, the late Rajah of Rewah and another by Mahatma Puran Sahib Rajah Vishvanath Singh interprets him as a theist and Mahatma Puran Sahib as a pantheist But the interpretations of both are at places faulty Both distort the meaning of the Bijak and thrust their own views into it The commentary by Rajah Vishvanath Singh suffers more from this defect, but the explanations given by Mahatma Puran Sahib are also very unsatisfactory where the verses of the Bijak have a theistic meaning

In the light of the above remarks we will now attempt to give a definite account of the real philosophy of Kabir We should note at the outset that Kabir criticises pure monism just as much as he repudiates uncompromising theism Against the pantheists he expresses his indignation in the following terms —

Singing of the One Above Qualities, they have gone
astray

The body of earth mingled with earth, air with air

—*Ramama*, 61

Rev Keay's remark that the God of Kabir is ' shadowy ' seems to derive its force from his negative description of

God His notion of God, however, is not a mere abstraction but the richest and the most positive of all

They call Him Emptiness, who is the Truth of truths,
in whom all truths are stored ¹

Kabir says "As you never may find the forest if
you ignore the tree so He may never be found in
abstractions" ²

The theists are also condemned likewise

The worshipper of Sagun pierces the six circles, and
drives the 'kolhu' (the indigenous oil machine)
without the bullock

—*Shabda*, 82

According to him both the worshippers of Sagun and
Nirgun have gone astray

The worshippers of Sagun and Nirgun did not under-
stand the meaning Many could not recognise
Him

—*Ramaini*, 4

One after another died the devotees those who
understood Him in qualities and without
qualities

—*Ramaini*, 54

Some declare Him Nirgun and some Sagun, some
speak of Him as light

To the Lord each assigns a name, but none reveals
His Form

Some pronounce Him subtle or gross, and some the
letter that has always truth

The Sat-Guru says, few recognise Him, and many
liars go about

¹ Tagore Hundred Poems of Kabir, p 80

² *Ibid*, p 96

Thus, in vain are the attempts of those who want to realise Him either in form or without form, for He is both 'form' and 'without form'

Searching and searching they died, but the form
without form none found

—*Sakhi*, 379

He is neither the static, motionless Absolute of the Pantheists nor the dynamic God of the Theists, but both at once

Can one say aught of rest or motion ?

He sits and yet He moves upon His way

Ramaini, 51

The synthetic vision of God which Kabir had achieved resolved for him the perpetual conflict between the Pantheists and the Theists. Like Ruysbroeck and St Augustine he had risen to a height of mystic vision from which he could perceive the contradictory concepts of God as the complementary opposites of a perfect Whole

II THE COSMOLOGY OF KABIR

The earlier Ramainis give an elaborate account of the cosmology of Kabir. Rev Keay doubts the efficacy of these verses and thinks that they are perhaps later additions to the Bijak. "Cosmology," he says, "seems much less developed in the Granth than in the Bijak and this is significant. It is doubtful if Kabir had a clearly conceived system in his mind and it is certainly next to impossible to reconstruct his system from his verses if he had one." This doubt arises in the mind of Keay owing to the belief entertained by him that Kabir's doctrine was essentially Pantheism which is antagonistic to all theories of creation. The suspicion, however, seems to be entirely baseless. Even if the earlier Ramainis were proved to be

of a later origin, many more lines could be quoted from almost all parts of the Bijak to show that Kabir did believe in creation, and even if it be true that like many other mystics Kabir did not have a clearly conceived and elaborate system in his mind, it is yet possible although somewhat difficult to reconstruct his system from his verses. The following verses from the various parts of the Bijak will amply justify this view —

The Maker himself became the Creator

Like the potter who makes the earthen pots of various kinds

Bidhna brought them all together and made innumerable exquisite arrangements

He burned them in the furnace of the womb,

Where he himself was the Preserver

—*Ram*, 26

The same thing is exemplified by Shabda 64 in which God is made the Weaver, from whose warp and shuttle comes out the universe

He spread the warp and took the shuttle The four Vedas are the wheels

One beam is Ram Narayan, which completes the whole work

In the trough of the ocean of the world he kneaded the starch

The body is the starch Few know who is the kneader of the starch

Moon and Sun are the two treadles and the warp is made in the mid-ocean

—*Shabda*, 64

In Chauntisi 6 He has been called a Painter, who has painted this mighty universe

A great picture has been painted
 Give up the picture and look at the Painter
 Give up the picture and remember Him who plays a
 unique game with this picture

Again in *Hindolu* 11

Having made pictures of various kinds Hari has
 started his dance

Who has got the wisdom of not forgetting himself in
 the desires

Swinging, swinging many ages have passed, yet the
 mind does not give up its craving

He made this play-swing, which swings in the night,
 through the four ages and the four months of the
 rainy season

Thus, in the face of the lines quoted above, there can be no
 doubt that Kabir was a firm believer in the doctrine of
 creation. The process of creation is described by him as
 follows —

In the inside there existed the Jiva
 Therein the light was manifested
 Desire, the woman was made,
 She was called Gayatri
 Three sons were born to that woman,
 They were named Brahma, Vishnu and Mahesh
 Then Brahma asked his mother,
 Who is your husband and whose wife you are
 You are myself and I am you, there is none else
 You are my husband, and I am your wife

Sakhi — Father and son have the same wife, born of
 the same mother

I have not seen a worthy son, who goes to see his
 father

This Ramaini is somewhat obscure and has been interpreted in different ways, but the second and third Ramainis are more explicit

In the beginning were Light, Shabda and one Woman
 She had Hari, Brahma and Tripurari
 They made numberless males and females
 None knew his beginning and end
 Bidhata (Brahma) made a house, which was thatched
 at fourteen places
 Hari Har and Brahma are the names of the headman,
 They then founded three villages
 And then they made the Khand and Brahmand
 Six Darshans and ninety-six Pakhandas
 Nobody was taught the Vedas in the womb
 The Turk was not born circumcised
 Woman that keeps us in the womb plays her part
 disguised in various forms

—*Ramaini*, 2

Who was born First
 Who was born second
 Brahma, Vishnu, Shiva and Shakti appeared
 From the beginning Jiva practised devotion
 Then appeared air, water, and shade
 Maya appeared and extended far and wide
 Then appeared the And, Pind and Brahmand
 The earth was then manifested in nine parts
 Then appeared sidh, sadhak and sanyasi
 They all devoted themselves to the Immortal one
 Then appeared the gods, men and munis and all
 others
 They all were defeated in their search

Sakh—The souls, etc , appeared
 He alone is the Lord and the rest are His slaves
 Kabir knows not more, his hope is only the name of
 Ram

—*Ramani*, 3

A still more detailed account of the cosmology of Kabir is given in the *Adi-mangal* which occurs in the beginning of the *Bijak*. In all these verses Kabir's view of creation seems to be this. In the beginning there existed the Eternal Supreme Purusha. In the light of that Purusha was a subtle substance the sum total of all individual souls. The substance was illuminated by that light. Then followed a desire in the shape of a woman. The desire was uttered in *shabda* or sound. When this desire was uttered the individual souls developed out of that subtle substance and thus the whole of creation followed.

It ought to be noted here that the creation does not develop out of the Supreme Purusha but a distinct subtle substance. The Philosophy of Kabir is, therefore, not a pure monism, as Ahmad Shah and Rev Keay have emphatically asserted. His philosophy rather seems to bear a closer affinity to Vaishnavism. According to this school the Supreme, All-pervading Soul, is the highest Truth devoid of illusion everywhere and through eternity. He is in Jivas and the Jivas are in Him as are the rays in the glowing sun and the particles of water in the vast rolling ocean. The ingredients and attributes of the whole must remain in the part in a smaller degree. So the part is identical with the whole when taken qualitatively but different when taken quantitatively. The natural function of the Jiva is service of the Supreme Soul. The Jiva gives up this function under the influence of *Maya* which is the *Bahiranga Shakti* or the outward

potency of the Lord, and thus passes through the innumerable cycles of birth and rebirth

Identity in difference between God and the Jivas has been repeatedly talked of by Kabir as shown in the previous chapters. In *Kahara* 10, he states this in simple words —

In all I am and am not Me they pronounce now this,
now that

My covering is a single sheet So men speak of me as
unity One unbounded without limit as the ray
of the moon in a pitcher of water

Ramaini 3, clearly describes devotional service to the Supreme Soul as the eternal function of the Jiva

From the beginning Jiva practised devotion

This is the true and the original religion of the soul In
it alone the Jiva can rest contented and happy

The religion which was from the beginning to the
end

That has been openly related to all

Sakhi —Accept this tidings as true and set it on your
heart

O *Sants*, in it lies contentment and happiness

Live in it and your heart will be satisfied

—*Ram*, 38

So long as the Jiva serves the Lord with all his heart and soul caring little for his own happiness he is safe and happy, but as soon as he gives up the service of the Lord and begins to seek his own happiness, happiness departs from him and he falls into miseries

They desired happiness and distress did not leave
them

—*Ram*, 41

And hence,

Says Kabir, Hear, O Sants,
At the feet of Rama do service

—*Shabda*, 13

All Jivas turn away from God under the influence of
Maya, which is His powerful instrument

O, Rama, you! Maya causes much confusion
None understands her and her secret
She makes gods, men, and munis to dance
O cotton tree, of what advantage are thy spreading
branches and thy beautiful flowers?
Many parrots perched on thy branches but flew on
tasting the cotton
O palm-tree, of what use is thy stately height?
None gets fruits from thee, when summer comes thy
shade is of no use

—*Shabda*, 13

The whole of creation has developed out of Maya

Maya appeared and extended far and wide
Then appeared the And, Pind and Brahmand
The earth was then manifested in nine parts
Then appeared sidh, sadhek and sanyasi

—*Ram*, 3

It may be pointed out here what Kabir exactly means by saying that the world is a creation of Maya. It is taken by some to mean that the world is illusory. But this is not the meaning of Kabir. The world is a creation of Maya but it is not Maya itself. The world is not an illusion because it has not come out of nothing as in the Buddhist Philosophy. Nor is it an illusion in Shankar's sense of Maya. According to Shankar the world possesses the same kind of falsity as that of a snake seen in a rope or silver seen in nacre. The world totally disappears like the false snake and the false nacre at the dawn of true

knowledge But according to Kabir the world never totally disappears At the time of dissolution it still exists in its essence as it is then resolved into the original substance out of which it is developed The world is declared to be Maya by Kabir because it does not possess the same kind of reality which the Supreme Purusha has The Supreme Purusha is eternal whereas the world is non-eternal and perishable The world has only temporary reality It is made and destroyed in succession

The serpent-god will perish, Garur waste and be destroyed

The deceitful and the truth-teller both will perish
All will perish, whether they taught sin or deeds of merit

Whether they believe in Sagun or in Nirgun,
Fire, air and water and all the universe
How far shall I name them

Vishnu's world will perish in a moment
I see always the shadow of destruction

Sakhi —Maya took the form of a fish, and Yama casts the angle

When Hari, Har, and Brahma could not escape what then of gods, men and munis ?

Everything that perishes and is devoured by Kal is called Maya

O Sants, that which comes and goes is Maya

Only the supreme soul is real, because

On the Protector Kal has no hold He has not gone nor has he come

The world therefore has got its reality but only a conditional reality in the philosophy of Kabir

The world's reality being thus proved the next question arises, "Why is the world created at all?" Against the ordinary dualistic conception of God it has been urged that if God be the external cause of the world the act of creation must be purposive and a purpose implies want or imperfection. Now God whose wishes are eternally fulfilled does not attain through creation any object not attained before. This difficulty faces all the dualistic philosophers. Kabir never gives any systematic explanation of this but it is not difficult to find out his probable answer from his verses. The motive of God in creating the world is not the attainment of any object to Himself or others but simply sport, play or Lila. The universe is a mere sportive dance of the Lord which spontaneously proceeds from Him.

Now I have understood the tricks of the sports of
Hari

With beat of drums he displays his feats, and again
gathers them up

In the play of Hari are deceived gods, men, and
munis

Maya has set up her show

She locked them up in the house and bewitched them

No wisdom entered their hearts

The play is false but the player is true such is the
faith of saints

Kabir says, according to his understanding is the
state of each

—*Shabda*, 78

The creative act proceeds simply from the Eternal Bliss which constitutes the very essence of the Lord

He is pure and indestructible

His form is infinite and fathomless

He dances in rapture, and waves of form arise from
his dance

The body and the mind cannot contain themselves,
when they are touched by His great joy

He is immersed in all consciousness, all joys and all
sorrows,

He has no beginning and no end,

He holds all within His bliss

—*Tagore*, XXVI

In view of these heart-rending verses which describe the eternal love sport of God, the opinion of the critics like Rev Keay and Ahmad Shah that Kabir's God is the unconditioned static absolute, is thrown overboard. Though the Eternal and the Absolute are not foreign to the consciousness of Kabir, yet his concept of the Divine Nature is essentially dynamic. Kabir tries to convey this idea to us by the symbols of dancing, singing, or swinging.

Between the poles of the conscious and the un-
conscious, there has the mind made a swing

Thereon hang all beings and all worlds, and that
swing never ceases its sway

Millions of beings are there the sun and the moon
in their courses are there

Millions of ages pass, and the swing goes on

All swing! the sky and the earth and the water, and
the Lord Himself taking form

And the sight of this has made Kabir a servant

—*Tagore*, XVI

Again just as the dance continuing for some time stops, so the sportive act of God continuing for some time comes to a standstill and that state is called dissolution.

With beat of drums He displays His feats and again
gathers them up

—*Shabda*, 78

Within the Supreme Brahma, the worlds are being
told like beads

Look upon that rosary with the eyes of wisdom

In His acts of creation and dissolution the Lord is assisted by Brahma, Vishnu and Mahesh. Brahma makes the world, Vishnu provides for its needs, and Mahesh decorates it. These three also work in the body of each being as the three qualities of Raj, Sat, and Tam. Brahma is Rajo-gun, Vishnu is Sato-gun and Mahesh is Tamo-gun.

Rajo-guna is Brahma, Tamo-guna Shankar, and
Sato-guna is Hari

Kabir says, abide in Rama there is neither Hindu
nor Turk

—*Shabda*, 75

In Kabir's doctrine of creation the theory of the word plays an important part. It appears to be strangely similar to the western theory of Logos. Thus we find, God in the Old Testament appears as communicating His will by His word. The word of God is represented as the creative principle. "God spake let there be light and there was light." A similar creative function, as we have already seen, is assigned by Kabir to the word. Again, in both the theories the word or Logos is also an instrument of revelation in the hands of God. With Philo, who for the first time developed the Logos theory God is absolute incorporeal perfection apprehensible only by reason, and Logos is affirmed as an intermediate agent. It is described as the elder son of God. Similarly, in Kabir the word is also a means for revelation.

That which you seek will not be found there. It is
within the immortal word

Kabir says, only he will understand the word whose
mouth and heart are one

III WAY TO GOD-REALISATION

A

Devotion is the way to God-Realisation. It is the natural function of the pure Jiva. Established in Bhakti the Jiva enjoys supreme bliss. But turned from it he falls into the ocean of untold miseries. He is ceaselessly tormented by Kal and Maya until he again takes shelter under the holy feet of the Lord and prays for His Bhakti.

Parted from Him they became without a master

Entangled in the dense forest they have lost the holy path

—*Ram*, 68

Becoming blind all roam, nobody considers

Without knowing the devotion of Hari the whole world is drowned and dead

—*Ram*, 65

The true meaning of Bhakti according to Kabir and the means to attain it will be explained later. Here we shall note a few important points concerning the realisation of God which Kabir emphasises. Time and again he declares that there are many who not knowing the Bhakti of God take to certain wrong paths for delivering themselves from the clutches of Maya and Kal. They undergo severe austerities. Renouncing the family they wander in the forests, keep fasts and give much pain to the body by twisting it according to certain Yogic postures. These practices are against devotion and are severely condemned by Kabir.

Twisting of body is not Bhakti, I saw many men in strange guise

—*Ram*, 67

Some critics of Kabir seem to think that Kabir propounds the Yoga philosophy in the Bijak and that he was himself a follower of Yoga. Mr. Ram Kumar Verma devotes a large part of his book on Kabir to Yoga. But this belief is due to a misapprehension. It is true he often uses the language of Yoga, to describe the condition of a devotee but never prescribes the method of Yoga for the attainment of the End. Many verses can be quoted to show Kabir's aversion for a mere Yogi.

The Yogi suffers, the Jangam suffices and the suffering
of the ascetic is doubled

—*Shabda*, 91

I never saw a Yogi like this who wanders in
ignorance

—*Ram*, 69

The Yogi thinks that God can be easily reached by crossing the six centres in the body and entering into Trikutī by a mechanical performance of certain Yogic exercises. But realisation is impossible without purging the heart of all its vices and making it pure.

Thinking of an easy path you lost the root
Instead of gain you had loss, O brother
On account of the weakness of your wit the moon
was set
Still you thought that the Lord lives in the junction
of Trikutī
Vishnu then explained to you
Renounce the eight vices
Then Sanak and his companions thought over this
essence
As if a beggar rejoices to get treasure
They were much comforted and doubt was gone

—*Ramani*, 13

Rev Keay quotes some beautiful lines from the Adi-Granth and Bijak to illustrate the same

Some shave men's locks and hang the black cord on
their necks

And pride themselves on the practice of Yoga

What credit is there in causing your seat to fly?

Crow and kite also circle in the air

—*Bijak Ram*, 71

Setting in the air, studying Yoga, Vedas, rites and
astrology, they are demented

Kabir says, The hope of the Yogi and the Jangam is
withered

—*Bijak Shabda*, 26

The Yogi says Yoga is best of all

O brother, it has no rival

Yogis with painted hair or shaven head, with sealed
lips or matted locks—where did those find
wisdom?

—*Bijak Shabda*, 38

The Yogi says that Yoga and nothing else is sweet

They who shave their bodies and the Ekqabdis say that
they alone have obtained perfection

Without God thou art lost in error, blind one!

—*Granth Gauri*, 51

Thou dependest on a club, earrings, and patched
coat

In error thou wanderest in a Yogi's garb

Put away thy devotional attitudes and thy suspension
of breath

Abandon deception, and ever worship God, O fool!

—*Granth Bivals*, 8

Kabir equally denounces the idol worship. He says
if by worshipping a stone God can be attained, I will

worship a mountain He also condemns all the external rules and regulations of worship which do not contain the essence of devotion The sacred thread, rosary, circumcision, fasting, sacrifice and pilgrimages have no place in his system

Devotion, sacrifice and rosary, piety, pilgrimage,
fasting and alms

Nine Bhaktis, Vedas, the Book, all these are false,
covering

One goes about with Shabdas, another boasts his
doings

Ever they claim respect and renown—both sects,
Hindus and Turks

—*Shabda*, 113 (A S)

Qazi, what is this book that you discourse on?

You are jangling and wrangling always, nothing of
wisdom do you know

Vainglorious of authority, you make me to be
circumcised never will I endure it, brother!

Leave these distractions, meditate on Rama, O foolish
mind!

—*Shabda*, 84 (A S)

There is neither action nor virtue, no mantras and
no worship at all

Rites and ceremonies have no worth at all He is
One there is no second

—*Shabda*, 43 (A S)

O fool and ignorant, you are astray, because you
know not Ram each moment

You attack and strike down the cow and cut her
throat to take her life

The life of the living you strike dead, and say your
slaughter makes it dedicated

This flesh which you call holy, hear how it was formed,
O brother

Flesh is composed of blood and seed that flesh you
eat is unholy

O fool, you do not admit this folly as your own, but
say your ancestors did it

Its blood is on your head and upon those who gave to
you this teaching

The black hairs of youth are gone and the snows of
age have fallen, still your heart has not grown
white

Of what value are your fastings, your prayers

Your calls to your prayer, your digging in a tiny cell?

Their Vedas and Puranas the Pandits read and the
Maulana studies his Koran

Kabir says, Those all went to hell who knew not Ram
each moment

Among many things which could not be tolerated by the
great reformatory spirit of Kabir was also the system of
Caste

If thou thinkest the Maker distinguished castes,
birth is according to these penalties for deeds

Born a Sudra you die a Sudra, It is only in this
world of illusion that you assume a sacred thread

If birth from a Brahmin mother makes you a
Brahman,

Why did you not come by another way?

If birth from a Turk mother makes you a Turk,

Why were you not circumcised in the womb?

If you milk black and yellow cows together, will you
be able to distinguish their milk?

Sakhi —O men, give up your pretence of great
wisdom Says Kabir recite the name of the
Bow-holder

Kabir discourages dry discussion in the matters of religion, unintelligent reading of the scriptures, and all sorts of false knowledge

What knowledge you have must be burned, then
within the body the light will shine

—*Chauntisi*, 8 (A S)

It is useless to indulge in argumentation or reasoning
for the intellect cannot grasp the reality Books are of no
avail so long as we do not possess the true knowledge

O Pandit, by reading and reading you have become
acute

Tell, explain to me this salvation of yours
Where dwelleth the Purusha in what village

O Pandit, expound him to me and his name
Brahma composed his four Vedas

But even he knew not the mystery of salvation
He has spoken much of almsgiving and deeds of
merit

But of his own death he had no knowledge
There is one name infinite and fathomless
There is settled Das Kabir

Sakhi —Where ant (wit) cannot climb, nor mustard
seed rest

Where coming and going can get no hold, thither let
the whole world go

—*Ram*, 34

O brother, thou art misled believing in the six
Darshans

Wrapped in the garb of Pakhanda
They came and destroyed the soul and life
The four Vedas are wise and clever but dumb

—*Ram*, 30

They are like mirrors to the blind who being without eyesight cannot look into them

Veda and Purana are the mirrors of the blind
 What does the spoon know of the taste of delicacies?
 As a donkey laden with sandalwood
 The fool does not know the sweet fragrance

—*Ram*, 32 (A S)

Scholarship is not essential for God-realisation but the purity of heart This is the essence of religion, all else is but groping in the dark

What the pandits and the mullas prescribed for me,
 I have received no (advantage) from, and have abandoned

My heart being pure, I have seen the Lord, Kabir
 having searched, searched and searched himself,
 hath found God within him

—*Adi Granth Bharan*

The stars shine till the sun rises

The Jiva is subject to Karma, till it be filled with knowledge

—*Sakhi*, 206 (A S)

B

Great is the power of Maya She has caught the whole universe in her net The Yogis, sanyasis and the learned pandits all try to set themselves free but in vain Not knowing the path of Bhakti they have all gone astray Only by serving the Lord one can rid himself of Maya

O Ram, thy Maya causes much confusion

One cannot understand her nature, gods, men and munis she makes to dance

What use is derived from the cotton tree which spreads its branches and gives beautiful flowers

Many parrots are sitting on the branches but they
fly when they taste the cotton
O palm tree, of what use is thy height none gets fruit
from thee

When the summer season comes thy shade is of no
use

His own wisdom he teaches others the wisdom of
gold and woman

Says Kabir, listen, O Sants, Serve the feet of Ram

—*Ram*, 13

Bhakti is sincere love of God, whole-hearted attachment to Him The Bhakta spends all his time in remembrance of the Lord He sings His praises to everybody and everywhere Only the name of Lord is dear to him He dislikes all else

The men of Hari in the form of swans range far and
wide they gather up the holy name and chant
it

They bear in their beaks the wreath of salvation and
charm others with it they keep silence or else
they sing praises of Hari

They live by the bank of Mansarovar

They set their heart on the feet of Rama elsewhere
they grieve

The crow's ill-wisdom comes not near them the
swans behold the vision everyday

They who separate the milk from the water, they,
says Kabir, are the devotees

—*Shabda*, 34 (A S)

Bhakti consists in most intimate and affectionate relationship with the Lord Between the Bhakta and his Lord there is no restriction or hesitation In the all-consuming fire of love which ties them both all customs, rites, and outward observances are dissolved Indeed

this spiritual relationship is altogether inexpressible To give a very poor description of it we might say that it is somewhat like the relation between husband and wife

Sakhi —From one egg of Onkar the whole universe came out

Says Kabir, all are wives of Rama unmoveable
Purusha is the Husband

—*Ramanni*, 27

Haris is my Husband, I am Ram's wife

—*R Shabda*, 35

Says Kabir, if I cast down my eyes and take the
Friend into my heart

I enjoy every pleasure with my Beloved, and I
disclose this to no one

Kabir is full of such passionate utterances, which show the depth of his divine love Some critics who walking on the footprints of Freud have given sexual meaning to the songs of devotees like Mira Bai, and Sur Das may hold Kabir also guilty of the same But there is nothing sexual in the mind of Kabir It is the burning passion of Kabir for God that bursts out in love songs like these

The Bhakta casts away all doubt and keeps firm faith
in God

Sakhi —Doubt has settled in your body, there throws
it's dice

The soul itself is wounded yet it utterly destroys the
other souls

The way of faith is wonderful past all describing

—*Ramanni*, 18 (*A S*)

Depending on the Lord the Bhakta calls Him aloud for help He believes that in the ocean of ever-increasing desires and anxieties the support of God is like a ship to

take him across He is fully conscious of his own weakness and knows that resting on his own strength he can do nothing The grace of God is absolutely indispensable

Sakhi —To save yourself from burning, why do you not cry aloud for help?

You have eaten poison and poisoned food heaped together day and night

—*Ramaini*, 13 (A S)

Now the burden of trouble weighs heavily

O soul, bestir thyself, that thou may'st see and consider

The thought of the mind is a wave of wickedness

Thou seest not its beginning nor end

Sakhi —In the ocean of desire Rama's support is a ship Kabir says, find Hari's refuge then you will cross it as if it were no bigger than the print of a calf's hoof

—*Ramaini*, 20 (A S)

One helpless Jiva, bound with many bonds

How can his own strength set him free, if his master give not release?

—*Sakhi*, 213 (A S)

But what is the way of attaining the Bhakti of Lord? The effect of Maya is great and the mind is turbulent How then to fix it upon God? There is but one way Repeat the name of Lord unceasingly It will cure you of your disease It is very powerful It will release you from Maya, nothing else can

Maya and desire are the troubles of the world

But no one thinks so of this

Maya and desire are a troublous noose

He who escapes therefrom is a true worshipper

He who taking Ram's name, lays hold upon the raft

Will safely float to sail across the world

Sakhī —The name of Rama is exceeding precious
 I have no concern with others
 From beginning to end, from age to age in the name
 of Rama alone I fight

—*Ram*, 76 (A S)

Sakhī —Repeat the name of Rama, renouncing the
 hope that causes all grief
 Else it will grind you from above and from below
 with all the force of fifty million mills

—*Ramaini*, 17 (A S)

My mind hath obtained resignation by the support of
 the name

Deceitful Maya hath led captive the whole world, but
 I have obtained immunity by repeating Ram's
 name

—*Adi Granth Asa*, 25

The Bhakta should recite the name every moment By
 constant repetition of the name of Lord the Bhakta
 will be attached to Him for ever He will easily gain
 His Bhakti in this way

Sakhī —Those who choose bondage get the fruit
 thereof it was then god that bound them
 Kabir says, They only will be saved, who repeat the
 Name every moment

—*Ramaini*, 9 (A S)

Now recite the immortal name of Ram
 O soul, leave not Haṁ nor go elsewhere
 Go whither you will, it is but to be a moth
 Let not yourself be burnt
 Know that to which you cleave is poison
 He who repeats the name of Rama in meditation
 Yielding to his glamour as Bhṛngikṛt resigns to his
 will

—*Ram*, 20

Kabir says, the hope of the Yogī and Jangam is
withered

If they repeat, like the chatīk, the name of Rama,
their abode in Bhakti is sure

—*Shabda*, 26

But mere repetition of the name with the mouth will
not do We are not to recite it unintelligently like a
parrot The name of Lord must spring from the
depth of the heart It is, therefore, the sincerity and the
purity of the heart which matters, not mere verbal repeti-
tion A man who is truly and whole-heartedly devoted
to the Lord alone can recite the true name

O Pandit, all your talking is a lie

If by repeating Rama's name the world is saved,
then by repeating ' sugar ' the mouth is sweetened

If by saying fire one's feet are burned, by saying
" water " thirst is quenched

If by saying " food " hunger is satisfied, then can
the world find safety so

Living with men a parrot cries ' Hari,' yet it knows
not the splendour of Hari

If ever it flies again to the forest, it will remember
Hari no more

Without touch, without sight, without feeling, merely
taking the name what is that?

If wealth came by but saying " wealth," then none
would remain in poverty

Their real love is for the pleasure of Maya, they do
but jest with the Bhaktas of Hari

Kabir says, unless one sings the one Rama, he will go
bound to the city of Yama

In the path of devotion there is the absolute necessity
of a Guru, a spiritual guide The finite being cannot

realise the Infinite without the medium of a spiritual preceptor who has himself realised God

“Guru’s enemies and the self-instructed men or women, must roam through eighty-four million births, so long as sun and moon exist”

—*Ramam*, 43 (A S)

Hari lost Guru shelters the Guru lost there is no refuge

O sinful man, call upon the Guru, not upon another

—*Sakh*, 419 (A S)

So long as the devotee does not attain the vision of Lord he renders devotion to his Guru, who sets him on the path of God-realisation and upon whom the devotee solely depends

O Father, (Guru) make for me my marriage, seeking out a worthy Husband

Till you find a worthy Husband till then wed me to Thyself

—*Shabda*, 68 (A S)

The devotee ought to be very careful in choosing his Guru The Guru must be selfless and capable of imparting true knowledge to the disciple

The Guru must be one who takes nothing from the disciple

The disciple must be one who gives all he has to the Guru

—*Sakh*, 422

Guru differs from guru and the natures of gurus are diverse

Worship ever that Guru who can reveal the secret of the word

—*Sakh*, 417

Men follow five or seven Gurus, he who can reveal
the word is the Guru indeed

—*Sakhī*, 418

He is to me a beloved friend who leads into right
paths those who have lost the road

The wise remains ever on the right path and in His
search he goes not astray

He is false who renounces the son

By the mercy of the Guru one learns of Rama

Although the mercy of the Guru is indispensable and
he sets his disciple on the right path, he cannot himself
give him perfect realisation This the disciple has to
gain by his own efforts under the guidance of the Guru

The fruit is far off, taste if you will The Sat-Guru
will not pluck and give you

—*Chauntisi*, 22

Those who take to the Path of Bhakti ever enjoy the
divine bliss This bliss is a unique experience and can be
known only by one who knows it It is indeed like the
dumb man's sugar which can be tasted but not described

They drink the cup of love's immortal juice, and are
intoxicated in the company of the holy

They control their lower and upper breath as in a
still and the fire of Brahma is kindled

In the centre it is closed the dirt of Karma is
skimmed the juice is distilled

Gorakh, Datta, Vasishta, Vyas, the poet Narad,
Shukmuni, collect it

Shambhu Sanak with his company are seated in
the assembly there the brimming cup passes

Ambrisha, Yagya, Janak, Jarha, and the Serpent-
God with his thousand mouths, drink of it

How shall I recount them from beginning to end? In
season, out of season, they are drunk with it

Dhruva, Prahlada, Vibhishana are drunk, drunken
 thetewith the wife of Siva
 Brahma, the unconditioned, was drunken in Brinda-
 ban still its influence is on him
 Gods, man, Munis, Yatis, Walis, whoever drank, he
 knew
 Says Kabir It is like a dumb man's sugar how can
 he explain its taste '

—*Shabda*, 12

The path of Bhakti or divine love is not only a means
 to the end for Kabir It is means as well as an end The
Summum bonum is not an absolute merge in the Infinite
 and annihilation of the self in Him, but a spiritual
 marriage with God in which the soul although united with
 Him and absorbed in the passion of His love is ever distinct
 from Him

AVATĀRAS OF GOD*

BY

S L KĀTRE, M A

D Litt Scholar (1930-32)

I INTRODUCTION

The word 'Avatāra,' derived from the root *तृ* with *अव* according to Pāṇini's Sūtra III 3 120 ("अवे तृस्त्रोर्घञ्"), primarily means a descent or a place of descent (like a ghāt). Then it also means the form or body in which God or other beings of the higher world are supposed to descend to the lower world. It is in this second sense that the word is popularly applied to the incarnations of Viṣṇu, other gods, sages, demons, etc. The word has lately also incurred the general sense of an extraordinary person, inasmuch as a man possessing extraordinary qualities is nowadays called an Avatāra without being intended to be identified with any particular god, etc.

Technical Meaning of 'Avatara '

In the Epics and the earlier Purāṇas, however, the word 'Avatāra' (as also its synonyms 'Prādurbhāva', etc.) is in most cases used technically to designate a specified form of descent of God, etc., to the earth. Viṣṇu, Śiva,

* The abbreviations used are ऋक्०=Rgveda Samhitā कूर्म०=Kūrma Purāṇa (Bibliotheca Indica), ब्रह्म०=Brahma Purāṇa, विष्णु०=Viṣṇu Purāṇa, हरि०=Harivamśa (Venkateshwar Press), मत्स्य०=Matsya Purāṇa (Anandās'rama), भाग०=Bhāgavata Purāṇa (Tattva-vivechak Press), महा०=Mahābhārata (Kumbhakonam edition). Other works and editions, except those of standard Vedio works, have been generally mentioned in full.

Indra and other gods are often described as descending¹ to the earth, for some reason or other, and subsequently returning to their abodes. All descents in these cases, however, are not called *avatāras* in the technical sense. Obviously, an *avatāra*, technically so called, always involves a change of form and in most cases also a birth subsequent to generation by a father and due existence in a mother's womb. It must be noted further that ordinary cases of transformation even of gods and ordinary cases of birth or rebirth involving all the elements mentioned above cannot be called *avatāras*. An *avatāra* as such is an extraordinary case involving all or most of these elements along with the association of a higher soul that is supposed to descend to the earth for making some outstanding achievement.

Later Modification

It is probably due to this reason that many transformations,² descents, manifestations, etc., of Viṣṇu himself are not designated as *avatāras* in the Epics and the earlier Purāṇas. This earlier conception of an *avatāra* technically so called seems to have undergone modification in the later Purāṇas where not only all transformations (like Viṣṇu's Mohinī form) but also some descents even without transformation (like Viṣṇu's coming on Garuda to the earth for rescuing the elephant from the crocodile), etc., of Viṣṇu are found designated³ as *avatāras*. The statements that all kings are

¹ *E G*, कूर्म० 14 (Viṣṇu coming personally to Prthu's sacrifice), विष्णु I 20 (Viṣṇu coming in his original form and rescuing Prahrāda buried beneath mountains), भाग० III 24 (Brahman, etc., coming down to greet Kardama and Devahūti on Kapila's birth), etc., etc. *Vide* also ऋक्० I 105 10, VIII 34, X 28 1, etc., etc.

² *E G*, Viṣṇu's Mohinī form which is not designated as an *avatāra* in the Epics and the Purāṇas with the exception of the Bhāgavata.

³ *Vide* भाग० I 3, II 7, etc.

Viṣṇu's incarnations,¹ that all creations, from Brahman down to a trifling insect are Viṣṇu's avatāras² and the like ones abound mainly in these later³ Purāṇas, where the few popular avatāras to which importance has been attached are designated as Viṣṇu's Līlāvatāras

Importance of Viṣṇu

Although the power of incarnation is in many places attributed to all gods, sages, demons, etc., yet it is Viṣṇu, the highest or one of the three highest gods, and as such generally described as Supreme God in Hindu Mythology, to whom this power is predominantly attributed. To an average Hindu, an avatāra is necessarily that of Viṣṇu, to the extent that the belief in an avatāra of Śiva, Kālī, etc., appears false or novel to him. This is, of course, due to the fact that Hindu Mythology in the matter of incarnation has exercised itself almost entirely with Viṣṇu to the practical exclusion of other deities. Naturally, therefore, the subsequent survey of the Epic and Purāṇic passages deals mainly with the incarnations of Viṣṇu.

Conception of Viṣṇu or Supreme God

Viṣṇu or Supreme God is, in fact, the Supreme Principle, all pervading, eternal, unborn yet endless, imperceptible, etc.⁴ He is the origin, the support, the life and soul and the ultimate submerging-place of all substances, forces, powers, etc., in the universe. In this original and true state, Supreme God is, of course, formless and without

¹ कूर्म० 22, 51, etc

² भाग० I 3 26 ff, II 6 41 ff, VIII 5 21, etc

³ Lateness only of the particular portions is hinted at. Other portions may be older, as generally different parts of a Purāṇa appear to be composed in different ages and many portions are word by word common to several Purāṇas

⁴ महा० XII 206, 347, etc

qualities¹ Yet, it is said,² He can be conceived in two ways, either as huge (Vīṇā) or as subtle (Sūksma) Conceived as huge, He is described as "thousand-headed," "thousand-eyed," "thousand-armed," etc., and His various limbs are identified with or are said to have given rise to, the different parts or forces of Nature, peoples, castes, etc. The well-known Purusasūkta of the Rgveda is undoubtedly the origin of this conception of God as huge³ What is suggested by the descriptions seems to be that Supreme God conceived as huge is a personification of all things in the universe that are perceptible either to the senses or to the imagination and that He is the primary source of all bodies in the universe Conceived as subtle, God is described as subtle yet all-pervading, full of all bliss and lustre, imperceptible to all worldly senses, whom only the enlightened persons can by means of their supreme knowledge feel as dwelling as a thumb-sized Purusa in the cavity of their heart What is suggested by the description seems to be that God conceived as subtle is the supreme stock of life, sensation, lustre, etc., that gives rise to all life, sensation, lustre, etc., in the world

Effects of Vishnu's Maya

Evidently God of this description is without a definite form and without the three qualities of Rajas, Sattva and Tamas Yet God is said to possess, among his numerous powers, a mysterious power called Māyā by means of which he becomes what he really is not and does what he is not expected to do Thus by means of Māyā He puts on a

¹ महा० XII 347, etc, भाग० VII 1, etc

² महा० II 43, XII 206, 286, 347, etc, हरि० I 41, 49, 50, etc, ब्रह्म० 70-71, etc, भाग० I 3, II 1, 2, 6, VII 1, X 40, 63, etc

³ This is clear from several identical words phrases, etc *Vide* also passages like "ब्रह्मान्न सत्त्वमुजो महात्मा विहृरब्धिमिश्रितकृपावण, etc" (भाग० II) 1

definite personality and also assumes the three qualities which are, in fact, foreign to His primary character.¹ Hence, His assumption of a definite personality or becoming at intervals Rājasa, Sāttvika and Tāmāsa is not a reality as such but a falsity-made-true affair that is due to his delusive mysterious power called Mīyā.

The abode of Supreme God or Viṣṇu who becomes personified in the way mentioned above appears at different places as Vaikunthī,² Śvetadvīpa,³ Badarī or Nīrīyan-āsrma,⁴ Kṣīrasāgara,⁵ Amṛta⁶ etc. The simple results of his assumption of the three originally foreign qualities, viz., Rajas, Sattva and Tamas are respectively the production, the nourishment and the destruction of the universe. When, however, he makes a mixture of the three qualities in different degrees, several complexities occur, e.g., some of the numerous types of beings (like gods, Dāitvas, Rākṣasas, Gandharvas, Yakṣas, men, beasts, birds, etc.) undergo excessive production or nourishment while others undergo excessive decay or destruction at the same time. Thus an excess of Tamas in God results in the excessive production, flourishing, etc., of demons, increase of evil, consequent overburdening of the earth, etc., and in the corresponding decay, destruction, etc., of gods. When God wants to change this state of affairs, he has to decrease his Tamas and to correspondingly increase his Sattva, the result being the flourishing, etc., of the pious races, the growth of Dharma and righteousness, etc., and correspondingly the destruction of

¹ महा० XII 206-347 (Vide specially एतत्त्वया न विज्ञेय रूपवानिति वक्ष्यते । इच्छन्मुहूर्तत्रिंशयेयमीशोऽहं जगतो गुरु । माया ह्येषा मया सृष्टा यन्मा पश्यसि नारद ॥”) etc., भाग० I 3, VII 1, VIII 18, 21, etc.

² भाग० III 15, etc.

³ महा० XII 343, etc.

⁴ हरि० I 50, etc.

⁵ महा० II 43, etc.

⁶ हरि० III 67 etc.

evil races, the fall of wickedness and evil, etc.¹ The ways in which God effects this change are so many, that of his incarnating himself on the earth being one of them.²

Mode of Incarnation Different Views

Now as to the way in which God incarnates himself on the earth. Many views can be traced, in some cases indistinctly, in the Epics and the Purāṇas. Four of them, appearing more important ought to be briefly dealt with here.

(1) The first view, traced only indistinctly, seems to be that Viṣṇu's spirit leaves his divine body, comes down to the earth and assumes an earthly body, generally with or sometimes without birth. The process suggested in this view appears in many respects similar to the common view of rebirth and the implication seems to be that at the time of an incarnation no portion of Viṣṇu's supreme spirit remains back in his divine body.³ This view, very popular among the common folk, seems to be the most primitive of all the views on this point.

(2) The second view on this point is that only a portion of Viṣṇu's supreme spirit descends to the earth and becomes incarnate while the other portion remains behind in his divine body at his abode.⁴ The portion descending may be a half, a quarter or a very small part⁵ of the whole.

¹ भाग० VII 1, etc.

² महा० III 182, etc., हरि० I 41, etc., ब्रह्म० 71 ff.

³ *Vide* such passages as मत्स्य० 47-34 ("त्यक्त्वा दिव्यां तनुं विष्णुर्मानुषेष्विह जायते । युगे त्वत्परावृत्ते काले प्रशिथिले प्रभु ॥"), etc.

⁴ *Vide* passage like "यदा यदा त्वधर्मस्य वृद्धिर्भवति भो द्विजा । धर्मश्च ह्यसमभ्येति तदा देवो जनार्दन ॥ अवतारं करोत्यत्र द्विषा कृत्वात्मनस्तनुम् । सर्वदैव जगत्पथे स सर्वात्मा जगन्मय । स्वल्पशेनावतीर्थीर्धर्मस्य कुरुते स्थितिम् ॥" etc. (ब्रह्म० 72 2-3 and 9).

⁵ Even such important avatāras as Balarāma and Kṛṣṇa are said to have evolved merely out of a white and a black hair of Viṣṇu.

Since only a portion descends to the earth at the time of an avatāra, it is possible according to this view to expect Viṣṇu to do something at his original place during the period of an avatāra¹ or to find his different incarnations meeting each other on the earth². This is possible also according to the two views to be mentioned hereafter, but it seems to be this view that has been generally adopted in the descriptions of particular avatāras, even in those works which in some chapters deal at length with the other views³.

(3) The third view⁴ on this point is that even originally Viṣṇu has divided himself into two bodies (Mūrtis). His first body dwells ever in the heaven and practises severe austerities while his second body sleeps the Yogic sleep on his bed in the ocean ever engrossed in meditation regarding the production, destruction, etc., of the Universe. This second body of Viṣṇu, having slept for a thousand Yugas on the bed, incarnates itself on the earth for some particular purpose. Thus all the works of Viṣṇu, excepting that of practising austerities allotted to his first body, are done by his second body. An avatāra of Viṣṇu, according to this view, is an incarnation, in full or in portion, only of his second body, *i e*, only of his half portion.

¹ *B G*, महा० XI 8, Viṣṇu talking with the earth in the heaven during the Kṛṣṇa Incarnation.

² *B G*, Paraśurāma meeting Rāma or Kṛṣṇa (महा० III 98, V 88, etc.)

³ *Viṣṇu*, for instance हरि० I 41, ब्रह्म० 71-72, etc.

⁴ हरि० I 41 18 ff (तस्य ह्येको महाराज मूर्तिर्भवति सत्तमा । नित्यं दिविष्टा या राजस्तपश्चरति दुश्चरम् ॥ द्वितीया चास्य शयने निद्रायोगमुपाययौ । प्रजासंहारसगार्थं किमध्यात्मविचिन्तकम् ॥ सुप्त्वा युगसहस्रं स प्रादुर्भवति कार्यतः । पूर्णं युगसहस्रे तु देवदेवो जगत्पतिः ॥) *etc* Commentator Nīlakantha describes the two Mūrtis respectively as Sāttvikī and Tāmasī. In महा० XII 206, etc., the two Mūrtis are named respectively as Vāsudeva and Saṁkarṣaṇa.

(4) The fourth and the most developed view is embodied in the Caturvīha theory¹ conceiving Viṣṇu as split up into four distinct bodies Viṣṇu, who was originally without form and qualities, made, after putting on a bodily form by means of his Māyā, his four bodies out of one. As to the names, the chronology, the functions, etc., of these four developed bodies of Viṣṇu, there is not unanimity and uniformity in different works which are also in some cases marred with obscurity. But generally the names of the four forms are given as Vāsudeva, Saṃkarsana or Śeṣa, Pradyumna or Sanatkuṃbāra and Aniruddha² and generally the first is said to have given rise to the second, the second to the third and the third to the fourth³. Of these the first, viz., the original Vāsudeva form is described as indefinable, bright, pure, omni-present, above the qualities, disinterested, with its form, colour, etc., unguessable. The second, viz., the Saṃkarsana or the Śeṣa body is described as bearing the

¹ *Vide* ब्रह्म० 71 16 ff (स देवो भगवान्सर्वं व्याप्य नारायणो विश्वे । चतुर्धा संस्थितो ब्रह्मा सगुणो निर्गुणस्तथा ॥ एका सूरिस्तु द्वेष्या शुद्धां पश्यन्ति तां बुधा । ज्वालामालावनद्वाङ्गी निष्ठा सा योगिना परा ॥ दूरस्था चान्तिकस्था च विज्ञेया सा गुणातिगा । वासुदेवाभिमानसौ निर्ममत्वेन दृश्यते ॥ रूपवर्णादियन्तस्या न भावा कल्पनामया । आस्ते च सा सदा शुद्धा सुप्रतिष्ठैकरूपिणी ॥ द्वितीया पृथिवी सृष्ट्वां शेषाख्या धारयत्यथ । तामसी सा समाख्याता तिर्यक्त्व समुपागता ॥ तृतीया कर्म कुर्वते प्रजापालनतत्परा । सत्त्वोद्विक्ता तु सा ज्ञेया धर्मसंस्थानकारिणी ॥ चतुर्थी जल-मध्यस्था शेते पन्नगतल्पगा । रजस्तस्या गुणं सर्गं सा करोति सदैव हि ॥ या तृतीया हरेर्मुक्तिं प्रजापालनतत्परा । सा तु धर्मव्यवधानं करोति नियतं भुवि ॥ यदा यदा च धर्मस्य रत्नानि समुपजायते । अभ्युत्थानमधर्मस्य तदात्मानं सृजत्यसौ ॥ इति सा सात्त्विकी सूरिस्वरता करोति च । प्रथमेति समाख्याता रक्षाकर्मण्यवस्थिता ॥ etc), महा० XII 342, 347, 356, XIII 263, मत्स्य० 248, भाग० V 17, etc

² In महा० XII 347 the four bodies are further philosophically termed as Puruṣa Jīva, Manas and Ahankāra respectively. In महा० XII 342 Viṣṇu's four forms are named as Nara, Nārāyaṇa, Hari and Kṛṣṇa

³ *Vide* महा० XII 347 73 ff (अस्मिन्सूरिश्चतुर्थी या सा सृजच्छेषमव्ययम् । स हि लोकेश प्रोक्त प्रथमं सोऽप्यजीजनत् ॥ प्रथमनादनिरुद्धोऽहं सर्गो मम पुन पुन, । अनिरुद्धात्तथा ब्रह्मा तन्नाभिकमलोद्भव, ॥), etc.

earth on its head from below and as possessing the quality of Tamas inasmuch as it has become a serpent. The third, *viz.*, the Pradyumna or Sanatkumāra form is described as engrossed in the nourishment of people, in the establishment of Dharma, etc., and as possessing the quality of Sattva. The fourth, *viz.*, the Anuuddha form is described as sleeping on the serpent-bed in the ocean, as possessing the quality of Rajas, as ever busy with the task of creation and as having created even Brahman who further created the entire world. Of these four bodies of Vishnu, the third, *viz.*, the Sāttvika Pradyumna body, to whom the tasks of the nourishment of people and the establishment of Dharma are entrusted, on due occasions, incarnates itself on the earth as a god, a man, or a beast¹ as need be, protects gods and other guards of Dharma and destroys the demons and other killers of Dharma.² Thus, according to this view, an avatāra of Vishnu is an incarnation, in full or in portion, of only his third body, *i.e.*, of only his quarter portion.

Chronology of the Four Views

As stated above, the first view, that God comes down in full leaving his divine body altogether, seems to be the most primitive among these views. This view although very popular among common people can be traced in the Epics and the Purāṇas rather indistinctly. The second view that only a portion of God's whole form comes down marks a considerable advancement of thought over the first, yet it lacks the scientific treatment of the third and the fourth view in that it makes one identical form of God do all things of the universe. It therefore seems to be later

¹ ब्रह्म० 71 41-42 “ देवत्वेऽथ मनुष्यत्वे तिर्यग्योनौ च संस्थिता । गृह्णाति तत्स्वभाव च वासुदेवेच्छया सदा ॥ ददात्यभिमतान्कामान्पूजिता सा द्विजोत्तमा ॥”

~ ² ब्रह्म० 71 24 “प्रोद्धतानसुरान्हन्ति धर्मैश्वर्येच्छित्तिकारिण । पाति देवान्स-
गन्धर्वान्धर्मरक्षापरायणान् ॥”

than the first and earlier than the third and the fourth. The fact that even the works, that propound the third and the fourth view at length in a few chapters of their own, do not even implicitly refer to those views in the descriptions of particular avatāras in their other chapters and unconsciously adopt the second view also seems to speak for an earlier age of the second view. The third view, which employs the scientific division of labour to some extent and entrusts, along with others, the function of incarnation to one of the two bodies of Viṣṇu, comes after the second view. And last comes the fourth view which carries the division of labour still further. Of course, some passages in the *Mahābhārata*¹ also mention the *Caturvyūha* theory. Yet there are many passages² where in the common genuine readings of all Manuscripts only the first two Vyūhas, *viz*, the *Vāsudeva* and the *Samkarsana*, are mentioned and the other two, *viz*, the *Pradyumna* and the *Anuruddha*, are mentioned only in the additional readings of few Manuscripts which appear to be later interpolations. This fact also suggests an earlier age for the third view and a later age for the fourth. It must be noted, however, that the *Caturvyūha* theory, although the latest among the four views, is possibly earlier than *Patañjali's Mahābhāṣya* (c 150 B C) which seems to allude to it in the quotation “*जनादेनस्त्वात्मचतुर्थे एव*”³, as has been shown by R G Bhandarkar³ who also holds the theory to be later than the *Bhagavadgītā*.

Conclusions from the Descriptions of Particular Avataras

From descriptions it appears that the avatāras *Matsya*, *Kūrma*, *Varāha*, *Nṛsimha*, *Hayaśīra*s, etc., are cases of mere transformation without birth. Viṣṇu is simply said to

¹ *Bṛ*, महा० XII 347, etc

² *Bṛ*, महा० XII 206, etc

³ *Vide* his *Vaiṣṇavism, Śaivism and other Minor Sects*

have transformed¹ himself into the respective forms which were needed for the particular achievements. When the achievements were over, Visnu is said either to have resumed his original form² or to have disappeared and become invisible³ or to have gone to his abode⁴. Thus birth, death, etc., do not seem to play part in the case of these avatāras. Visnu had to assume these inhuman forms generally because the respective achievements could not have been made without those forms or sometimes because Visnu had a liking for them.

Most of the remaining avatāras are said to have involved birth, etc., after the human course. As to how Visnu came to usher himself in the human process, many ways are mentioned of which two or three appear to be more important. In some cases Visnu is said to have first entered, or associated himself with, the body of the father and thence to have been transferred in the natural course to the mother's womb⁵. In some cases Visnu is said to have made his way into the mother's womb through some food eaten by her⁶. In some cases he seems to have directly entered the mother's womb without any middle

¹ *Vāṇī* विष्णु० I 4 (प्रजापति ॥ अकरोत्स्वतनूमन्या कल्पादिषु यथा पुरा । मत्स्यकूर्मादिका तद्गद्गाराह वपुरास्थित ॥)

² *B g*, कूर्म 16 (Varāha and Nṛsimha), etc

³ *B g*, भाग० VII 10 (Nṛsimha), etc

⁴ *B g*, मत्स्य० 163 (Nṛsimha), etc

⁵ *B g*, भाग० III 24 6 (तस्यां बहुतिथे काये भगवान्मधुसूदन । कादम् वीर्यमापन्नो जज्ञेऽग्निं च दारुणि) । VIII 17 21 ff (अदितिर्दुर्लभं लब्ध्वा हरेर्जन्मात्मनि प्रभो । उपाधावत्पतिं भक्त्या परया कृतकृत्यवत् ॥ स वै समाधियोगेन कश्यपस्तदबुध्यत । प्रविष्टमात्मनि हरेरशं श्रुतिथेक्षया ॥ सोऽदित्यां वीर्यमाधत्त तपसा चिरसन्भुतम् । समाहितमना राजन्दास्ययनिं यथानिल ॥), X 2 16 ff (भगवानपि विष्वात्मा भक्तानामभयङ्कुर । आविवेशाभागेन मन आनकदुन्दुभे ॥ ततो जगन्मगलमच्युतांशं समाहितं श्रुतेन देवी । दधार सर्वात्मकमात्मभूतं etc, etc

⁶ *B g*, रामा० I 16, ब्रह्म० 8, etc

link ¹ The period of God's existence in the mother's womb is in some cases after the human manner and in some cases otherwise ² In some cases God is said to have been born in his supreme form and to have subsequently become a child ³ Many superhuman and miraculous achievements are attributed almost to all these avatāras, but the main achievement of every avatāra, with the exception of the Vāmana incarnation, appears not of the superhuman type but of the extraordinary human type with its details exaggerated Some of these avatāras⁴ are said to have ended with the death of the physical body and subsequently to have united the part-soul with the supreme whole-soul of Viṣṇu A few avatāras, ⁵ on the other hand, are said to have become physically immortal About Vāmana, however, some versions⁶ say that he ultimately became invisible while others⁷ say that he was taken by the gods to the heaven and given the office of Upendra

Occasion and Purpose of Avatara

The general rule as to the occasion and the purpose of an avatāra of God is stated in the following celebrated lines of the Bhagavadgītā (IV 7-8) —यदा यदा हि धर्मस्य ग्लानिर्भवति भारत । अभ्युत्थानमधर्मस्य तदात्मानं सृजाम्यहम् ॥ परित्राणाय साधूनां विनाशाय च दुष्कृताम् । धर्मसंस्थापनार्थाय संभवामि युगे युगे ॥ When there occurs a decay of Dharma and a rise of Adharma and the consequent affliction of the saints and flourishing of

¹ Eg, विष्णु० IV 15 30 etc

² Eg, महा० III 273, हरि० III, 69, etc (Vāmana was born to Aditi one thousand years after the conception)

³ Eg, भाग० VIII 18 (Vāmana), X 3 (Kṛṣṇa) etc

⁴ Eg, Rāma, Kṛṣṇa, etc

⁵ Eg हरि० I 41 119, भाग० IX 16, etc (Parasurāma), भाग० III 33 35 (Kapila), etc

⁶ कूर्म० 17, etc

⁷ भाग० VIII 23, etc

the wicked, God incarnates himself on the earth and re-establishes Dharma, rescues the saints, destroys the wicked and dispels Adharma. Numerous passages¹ in the Epics and the Purāṇas repeat this self-same idea in almost identical words.

To this general rule much can be added from other statements and from the descriptions of particular avatāras. General welfare of people is of course the primary aim of all the incarnations. Many an avatāra² takes place to give relief to the earth when she is overburdened due to the numerousness of evil races and to the excess of Adharma and wickedness. Overburdening of the earth due to the numerousness even of righteous races and not at all involving³ Adharma and wickedness seems also to have occasioned some avatāras. Several avatāras⁴ are said to have occurred with the object of saving the Vedas, sacrifices, etc., from some impending disaster and of re-establishing them subsequently. A few avatāras are also said to have taken place mainly with the object of promulgating particular branches of knowledge⁵ or of expanding the Vedas.⁶

¹ *Eg.*, महा० III 192 28 ff, 273 72 XIII 283, 12, etc., ब्रह्म० 71, 25, etc., सत्स्य० 235, etc.

² *Eg.*, Kṛṣṇa (ब्रह्म० 72, etc.), Paraśurāma (भाग० IX 15 16, etc.), etc.

³ In हरि० I 51, Brahman, etc., inform Viṣṇu, on the eve of the Kṛṣṇa incarnation, that Dharma and righteousness are well established and quite unmolested on the earth and that the only cause of anxiety is the overburdening of the earth due to the numerousness of kings (सत्पथे हि स्थिता सर्वे राजानो राष्ट्रवर्धना । नराणां च त्रयो वणा ब्राह्मणाननुयायिन ॥ सर्वं सत्पथं वाक्यं वणा धर्मरान्तथा । सर्वं वेदपरा विप्रा सर्वं विप्रपरा नरा ॥ एव जगति वर्तन्ते मनुष्या धर्मकारणात् । यथा धर्मवधो न स्यात्तथा मन्त्र प्रवर्त्यताम् ॥ सतां गतिरिय नान्धा धर्मश्चास्या सुसाधनम् । राज्ञां चैव वध कार्यो धरण्या भारनिर्घोषे ॥)

⁴ *Eg.*, Matsya, Hayagrīva, Dattātreya, Buddha, etc., of the object of Śiva's avatāras mentioned in कूर्म० 30, 53, etc.

⁵ *Eg.*, Kapila, Dattātreya, Dhanvantari, etc.

⁶ *Eg.*, Vyāsa etc.

Some of Viṣṇu's avatāras are said to have occurred for the fulfilment of his devotee's desires¹ or for the fulfilment of his promises to his devotees². Some of his avatāras³ are said to have taken place for rescuing, or giving relief to, his devotees. The establishment of the welfare of gods, sometimes even at the cost of their pious and righteous adversaries,⁴ appears to be the main cause of a number of Viṣṇu's avatāras⁵. In fact Viṣṇu is generally depicted as partial for gods. Other occasions and purposes of avatāras are not important and need not be exhausted here.

These occasions and purposes of Viṣṇu's avatāras are, however, with reference to others. Viṣṇu himself is quite perfect and has no interest of his own to be served by his incarnations. Still it is said at some places that he incarnates himself on the earth for the sake of sport or diversion⁶. Some Purāṇas⁷ say that Viṣṇu was compelled to go through seven human incarnations as a result of sage Bhṛgu's curse to him consequent to his killing the sage's wife.

The above statement regarding the occasion and purpose of Viṣṇu's avatāras does not appear to be without exceptions and counter-exceptions. In some cases (*e g*, during Vena's reign)⁸ all the necessary usual occasions of an avatāra

¹ *Vide* मत्स्य० 47 (Viṣṇu was born as Kṛṣṇa for fulfilling Devakī's desires), कूर्म० 17 (He was born as Vāmana for fulfilling Aditi's desires), etc.

² *Vide* भाग० III 24 (Viṣṇu was born as Kapila to make true his promise to Kaṇḍama), etc.

³ *Eg*, Matsya, Varāha, Nṛsimha, Vāmana, etc.

⁴ *Eg*, Bali is depicted as a demon of religious temperament in कूर्म० 17, etc.

⁵ *Eg*, Kūrma Vāmana Mohinī, etc.

⁶ *Eg*, मत्स्य० 47, (विहारार्थं), भाग० VII 1 10, (रिसु), X 2 39 (विनोद), X 40 16 (क्रीडनार्थं).

⁷ *Eg*, मत्स्य० 47 105 ff, etc.

⁸ *Vide* मत्स्य० 10, ब्रह्म० 2, विष्णु० I 13, हरि० I 5, भाग० IV 13, etc.

seem to be present and yet the avatāra does not occur and the achievement is made by someone else (e.g., the sages etc., kill Vena) In some cases (e.g., in the war against Tāraka, Maya, Kālanemi and other demons),¹ Viṣṇu is said to have made the achievement without incarnating himself, i.e., in his original form

Recognition of Avatara.

From descriptions it appears that sages, pious people devotees of God, etc., could fully recognise an avatāra as such, whereas demons, wicked and heterodox people, etc., could not The hostility cherished by these demons, etc., against Viṣṇu or his avatāra is sometimes² depicted as Virodha-bhakti, i.e., devotion under the guise of hostility These demons, etc., it is said, were in fact ardent devotees of Viṣṇu and brought themselves into contact with him by means of their feigned hostility with a view to attaining supreme death at his hands They could not attain salvation until they recognised the killer to be Viṣṇu himself and had consequently to pass through some births But as soon as they recognised the killer to be Supreme God himself, they not only attained salvation but also attained supreme union with Supreme God Himself³

At some places,⁴ some physical signs are mentioned as a means of recognising an avatāra Still, generally in the case of human incarnations, the possession of exceptional

¹ *Vide* सत्स्य० 172-178, हरि० I 42-48, etc

² *E.g.*, भाग० VII 1 ff

³ *Vide* भाग० VII 10, विष्णु० IV 15, etc

⁴ *Vide* भाग० IV 15 about Prthu (तद् दृष्ट्वा मिथुने जातमृषये
शङ्खवादिन । ऊचुः परमसेतुषा विदित्वा भगवत्कलाम् ॥ ब्रह्मा जगद्गुरुद्वै सहास्य
सुरेश्वरै । वै यस्य दक्षिणे हस्ते दृष्ट्वा चिह्नं गदामृत ॥ पादयोः रविन्दं च तै वै मेने हरे
कलाम् । यस्याप्रसिद्धं चकर्मणः स परमेष्ठिनः ॥) V 3 about Rābha (‘उत्पत्यैवा-
भिव्यज्यमानभगवत्कलाम्’ etc) etc

qualities¹ seems to be the main sign of recognising an avatāra for an average man. In fact, some at least of the human incarnations (*e g* , Kapila, Parasurāma, Rāma, Kṛṣṇa, etc , possibly and Buddha definitely) seem to be historical personages who later on came to be identified with Supreme God due to their exceptional achievements.

Doubts about Avatara

Many doubts expressed by some sages,² Parīkṣit,³ Janamejaya,⁴ etc , are recorded in the Purāṇas as to how it is that Viṣṇu, aware as he must be of the extremely miserable character of the earthly existence, even dreams of leaving the supreme enjoyments of his abode and of passing a comparatively painful and wretched life among men or beasts even for a short time , how it is that Viṣṇu, who ought to be uniform in his treatment to all people, becomes favourable to the gods and hostile to the demons , how it is that Viṣṇu, all-pervading and all-powerful as he is, could be accommodated in the minute foetus of a mortal woman, and so forth. The replies given by Vyāsa,⁵ Śuka,⁶ Vaiśampāyana,⁷ etc , say, in short, that all this is due to Viṣṇu's Māyā. Even Viṣṇu's assumption of the supreme form and residence at Vaikuntha or other abodes abounding in supreme enjoyments are results of his Māyā. Further, his possession of three qualities and, as a result of

¹ *Vide e g* , विष्णु० IV 13, 52 ff (निर्जितश्च भगवता जन्मवान्प्रणिपत्य व्याजहार ॥ स्रष्टारगन्धर्वेयज्ञराक्षसादिभिर्पयसिलैर्भवान्न जेतुं शक्यः अथय भवतास्मत्स्वामिना रामेणैव नारायणस्य सकलजगत्परायणस्यंशेन भगवता भवितव्यं etc), etc

² ब्रह्म० 70

³ भाग० VII 1

⁴ हरि० I 40

⁵ ब्रह्म० 71 ff

⁶ भाग० VII 1 ff

⁷ हरि० I 41 ff

it, his hostility towards any particular race also result from his Māyā. Consequently his incarnation on the earth as a man or a beast, the destruction of the demons, etc., too, are all sports of his Māyā and not realities as such.¹ In fact, Viṣṇu is formless and without qualities and so what is done by his Māyā has no real effect whatsoever on him. Hence the apparent occurrences of impossible or unaccountable events in the course of his incarnations need not occasion any surprise since the incarnations themselves are not realities as such but sports of Viṣṇu's delusive Māyā.²

Antiquity of the Doctrine of Avatara

The doctrine of Avatāra appears in the Bhagavadgītā in a considerably developed form and seems to be much earlier than Gautama Buddha. The doctrine has given rise to the Nirmāṇa Kāya principle of Mahāyāna Buddhism and has been adopted in the numerous Jātaka-kathās (of pre-Christian centuries) wherein Buddha and others are shown as undergoing a series of incarnations among different types of beings. In the Brhaddevatā,³ in the Upaniṣads and also in the Brāhmanas⁴ we find several allusions to gods, etc., transforming themselves into, or being born among, men or beasts for making some particular achievement. Thus the conception of avatāra in a somewhat crude form goes back at least to the age of the Brāhmanas.

¹ *Viḍe* भाग० I 3 30 ff

² *Viḍe* हरि० I 41 174 ब्रह्म० 104, 162 (where the अवतार is called योगेश्वरयोगसाया)

³ *Viḍe* passages like I 114 ff (ऐन्द्र सव्य शतचिषु ॥ स्वयमिन्द्रायम पुत्रमिच्छतोऽङ्गिरसो मुने । वज्रयेव सव्योऽभूच्चैर्योगित्वात्पुत्रतां गतः ॥) VII 49-60 (Indra becoming son of Viṣṇu quoted further), etc.

⁴ *Viḍe* the passages noted further to trace the origin of the Kūrma, Varāha and Vāmana avatāras

Germens in the Rġveda Samhitā

Possibly the germens of the conception of avatāra may be traced back even in the Rġveda Samhitā. The conception of avatāra is allied in a considerable degree to the doctrine of rebirth or transmigration of soul and to the doctrine of immortality of soul. It has been shown by scholars like Prof R D Ranade¹ that the two doctrines are clearly visible in many hymns of the Rġveda Samhitā.² Many other elements too of an avatāra seem to be present in the Rġveda Samhitā as will be presently shown.

The belief in the potency of gods and other superhuman beings to assume various forms or bodies and to move on the earth even among human beings can be traced in a number of hymns.³ In अक्. III 53 8⁴ and VI 47 18,⁵ Indra is alluded to as assuming various forms by means of his Māyā. Of course, the word Māyā in the Rġveda has got a sense different from its classical sense⁶ and Indra's assumption of the various forms alluded here does not seem to be wholly identical with the developed conception of Avatāra. Yet the word Māyā in the passage seems to have been explained in the classical sense at least from the age of the

¹ *Constructive Survey of Upaniṣadic Philosophy*, pp 149 ff

² *Ēg*, I 164, X 16, X 58, etc

³ *Ēg*, अक्. VII 104 22 "उत्कयात् शुश्रूकयात् जहि श्यातुमुत् कोकयातुम्। सप्यायातुमुत् गृध्यात् हवेदेव प्र मृगा रज इद् ॥" (where Rakṣasas or demons are said to assume the forms of owls etc.), X 95, 6 "यद्विरूपाचर मर्त्येष्ववर्षे रात्री शरदश्चतस्र। धृतम्य स्तोत सङ्कदङ्ग आभ्रा तादेव तत्तृपाणा चरामि ॥" (where Urvaśī a celestial damsel, is said to have changed her form, dwelt among mortals for four years and subsequently returned to her abode)

⁴ "रूप रूपं मधवा बोभधीति माया कृण्वानस्तन्व परि स्वात्। त्रिर्यद्वि परि मुहूर्तमागात्स्वैनन्त्रैर्यतुपा ऋतावा ॥"

⁵ "रूपे रूपे प्रतिसूये बभूव तदस्य रूपे प्रतिलक्षणाय। इदो मायाभि पुरुष इयते युक्ता ह्यस्य हरय शता दश ॥"

⁶ Śaṅkara explains मायाभि in VI 47 18 as ज्ञानै, आत्मीयै सेकस्यै,

Mahābhārata¹ and a reflection of avatāra seems to have been discovered in the passages for several centuries

The belief that gods are occasionally born on the earth for various reasons can also be traced indistinctly to some extent, in the Rgveda Samhitā In X 53 5² “पच जना” are described as गोजाता Sāyana here explains “पच जना” as “देवादयः” (gods and others) and “गोजाता” as “भूभ्यामुत्पन्ना” (born on the earth) and further as “यद्वा पय आविक” (milk, etc.) Thus, according to Sāyana’s first explanation of “गोजाता”, here is an allusion to the birth of gods, etc., on the earth. Others explain “पच जना” as five Āryan tribes and Sāyana himself explains the phrase in a different way at other places. Yet, considering that “पच जना” are here invoked for partaking of the oblations offered, Sāyana’s first explanation here seems to suit the context. However, much emphasis cannot be laid on this point since Sāyana himself gives an alternative explanation of “गोजाता”.

The following cases are perhaps more closely allied to the conception of avatāra. In I 51 13³ Indra is said to have become Vrsanasva’s Menā. Sāyana⁴ explains Menā

¹ *Vide* महा० XIII 75 25 ff “स (= इन्द्र) हि रुगाणि कुर्वते विविधानि भृगून्मम ॥ चहुमाय स विप्रं बलहा पाकशामन । तास्तान्विकुर्वते

भावान्वहून्मम सुहुसुहु ॥” The Vedic passages quoted above are undoubtedly the source of the idea embodied in these lines.

² “पच जना मम द्वेष्ट जुषता गोजाता इत ये यज्ञियास । पृथिवी न पार्थिवात्पात्वं हसो अन्तरिक्षं दिव्यात्पात्वंस्मान् ॥”

³ “अक्षदा अर्धं महते वचस्ये कक्षीवते वृचयामिन्द्रं सन्वते । मेनाभवो वृषणश्च स्य स्रक्तो विश्वेत्तर ते सवनेषु प्रवाच्या ॥” Compare X III 3 “इन्द्रं किल श्रुत्यास्य वेद स हि जिष्णु पथिकृत्स्नयैव । आन्मेना कृण्वन्नच्युतो भुवद्गो पतिर्दिव सनजा अप्रीति ॥” where Sāyana explains “आन्मेना कृण्वन्” as “वृषणश्च मेनामात्मानं कुर्वन्”.

⁴ “वृषणश्चस्य एतदाख्यस्य राज्ञ मेना नाम कन्यका अभू । तथा च शाक्यानिभि सुश्रययामन्त्रैकदेशव्याख्यानरूपे ब्राह्मणमेवमाज्ञायते—वृषणश्चस्य मेन इति वृषणश्चस्य मेना भूत्वा मघवा कुल उवासेति । तौ च प्राप्तयौवना स्वयमेवेन्द्रश्चक्रमे । तथा च तारिडभिरास्नात—वृषणश्चस्य मेना नाम दुहितस, तामिन्द्रश्चक्रम इति । मेनेति स्त्री नाम मेना प्रा इति पाठान् । मन ज्ञाने । मन्यते गृहकृत्यं जानातीति मेना । मेना मानयत्येना इति यास्कः ।”

as "King Vrsanaśva's daughter named Menā" and supports his explanation with quotations from the Śrītyāyana Brāhmaṇa and the Tāndya Brāhmaṇa. Thus in this passage we have an allusion to India having become daughter of king Vrsanaśva. Undoubtedly such a meaning was given to the passage as early as the age of the Brāhmaṇas.

In VIII 17 13¹ India is addressed as "शृगवृषो नपात्" (son of Śrngavrs) Sāyana² gives two alternative explanations of the phrase, viz., son of Śrngavrsan or protector of Āditya and mentions in support of his first explanation an Ākhyāyikā (traditional myth) saying that India himself was born as son of a sage called Śrngavrsan. If the Ākhyāyikā, which is possibly not traceable in the Brhaddevatā, is authentic, then in this passage we have an allusion, exactly parallel to an avatāra. However, Sāyana himself does not seem to be very particular about the allusion since he gives an alternative explanation of the passage.

These and similar other passages³ in the Rgveda Samhitā may be said to be the indistinct Vedic germs of the conception of Avatāra. Many words and phrases on which this statement is based are ambiguous and obscure. Consequently too much emphasis cannot be laid on the indisputability of the statement. It has been noted in the

¹ "यस्ते शृगवृषो नपात्प्रणापात्कुंडपाय्य । न्यस्मिन्दध्र आ मन ॥"

² "शृगवृषा नाम कश्चिद्विस्तृतस्य चंद्र स्वयमेव पुत्रतया जज्ञे इत्याख्यायिका यद्वा आदित्यस्य रजित ।"

³ *Vide* further that the Deity of X 47 and the Deity as well as the Seer of X 48-50 is said to be Vaikuṇṭha Indra (*vide* below footnote for the myth given in the Brhaddevatā). The Deity of X 119 is said to be Labarūpāpanna Indra (i.e., Indra in the form of a quail). The Deity of II 42 and 43 is said to be Kapinjalārūpm Indra (Indra in the form of a Kapinjala bird) about which Brhaddevatā IV 93 ff. says—"स्तुति च पुनरेवेष्टिद्वो भूत्वा कपिञ्जल । अर्पेर्जिमिवोरशा ववाशास्थाय दक्षिणाम् ॥ स तमापेयं संप्रेक्ष्य चक्षुषा पक्षिरूपिणम् । पराभ्यामतितुष्टाव सूक्ताभ्यां तु कनिक्कदत् ॥" The myths, however, may have been lately discovered.

beginning that the Purusasūkta is the germ of the conception of Viṣṇu's huge form which, the Purāṇas¹ say, is the root of all incarnations, creations, etc., of Viṣṇu. The origin of some of Viṣṇu's incarnations is found in the Vedic literature as shall be noted below in the treatment of particular avatāras. Some Purāṇas² seem to recognise the Vedic origin of such incarnations when they attribute the details of these incarnations to Veda while at the same time they attribute the details of other avatāras to Purāṇas.

Number of Viṣṇu's Avataras

It has been remarked above that Viṣṇu is the most important god in the sphere of incarnations as in other spheres. Although many of his later traits³ are found also in the Rgveda Samhitā, yet, taken as a whole, Viṣṇu, there ranks considerably below Indra. He becomes higher in the Brāhmanas and in the Epics and the Purāṇas he becomes almost the highest god. Consequently many features of Indra, Varuna, Prajāpati, etc., the higher gods of the earlier stages, have come to be attributed to Viṣṇu in the later stage.

¹ *Vide* भाग० I ३ - 'जगुहे पौरुष रूपं भगवान्महदादिभि । संभूतं षोडशकलमादौ लोकसिसृक्षया ॥ यन्वावयवसंस्थाने कल्पितो लोकविस्तर । तद्वै भगवतो रूपं विद्युद्ध सत्त्वमूर्जितम् ॥ पश्यत्यदो रूपमदन्नचक्षुषा सहस्रपादोरुभुजाननाद्भुतम् । सहस्रमूर्धश्रवणाग्निनासिक सहस्रमौल्यं वरकुंडलोद्धतम् ॥ एतन्नामावताराणां निधानं बीज-मव्ययम् । यस्यांशोऽंशेन सृज्यन्ते देवर्षिर्यङ्मरादय ॥'

² *Vide* हरि० I 41 103—'दृष्टं ते वामनो नाम प्रादुर्भावो महात्मनः । वेदविज्ञिर्द्विजैरेव कथ्यते वैष्णव यथा ॥' about Vamana and further 149 'गाथा अय्यत्र गायन्ति ये पुराणविदो जना । रामे निबद्धतत्त्वार्था माहात्म्यं तस्य धीमत ॥' about Rāma भा० 104 98 and 145 repeat these lines word by word.

³ *Id* q., the ideas of Viṣṇu helping and protecting Indra (I 85 7 "विष्णुर्वावावृष्टुषणं मद्व्युत," etc), Viṣṇu upholding Dharma or laws (I 22 18—"अतो धर्माणि धारयन्" etc), Viṣṇu dwelling on the mountainous Badari (I 159 "गिरिष्ठा" "गिरिजिते," etc), Viṣṇu possessing a huge body (I 105 6 "बृहच्छरीर" etc), etc, etc.

As regards the number of Viṣṇu's incarnations, there is a difference of opinion. The current popular list¹ includes ten avatāras, viz., Matsya, Kūrma, Varāha, Nṛsiṃha, Vāmana, Paraśurāma, Rāma, Kṛṣṇa or Balarāma, Buddha and Kalki. There are some other lists of ten avatāras. मत्स्य० 47 mentions three Divya or divine, viz., Nārāyaṇa, Nṛsiṃha and Vāmana and seven Mānusa or human, viz., Dattātreyā, Māṇḍhātā Cakravartin, Paraśurāma, Rāma, Vyāsa, Buddha and Kalki. हरि० I 41 mentions these ten avatāras—Pauṣkaraka, Varāha, Nṛsiṃha, Vāmana, Dattātreyā, Paraśurāma, Rāma, Kṛṣṇa, Vyāsa and Kalki. Notably ब्रह्म० 104 is word by word identical with हरि० I 41 with the difference that Vyāsa, who himself is narrating the Brahma-Purāṇa, does not include himself among the avatāras. Thus ब्रह्म० 104 mentions only nine avatāras.

भाग० I 3 and II 7 give two lists of Viṣṇu's twenty-two avatāras. भाग० I 3 mentions Sanatkumāra, Varāha, Nārada, Nara-Nārāyaṇa, Kapila, Datta, Yajña, Rṣabha, Prthu, Matsya, Kūrma, Dhanvantari, Mohinī, Nṛsiṃha, Vāmana, Paraśurāma, Vyāsa, Rāma, Balarāma, Kṛṣṇa, Buddha and Kalki. भाग० II 7 mentions Varāha, Suyajña, Kapila, Datta, Catuṣṣana, Nara-Nārāyaṇa, Prthu, Rṣabha, Hayasīra, Matsya, Kūrma, Nṛsiṃha, Gajendramokṣakara, Vāmana, Hamsa, Dhanvantari, Paraśurāma, Rāma, Balarāma, Kṛṣṇa, Vyāsa, Buddha and Kalki.

कूर्म० 51 mentions seven avatāras, viz., son of Ruci and Prakṛti, son of Tusitā, son of Satyā, son of Haryā, Mānasa, Vaikuntha and Vāmana. Notably enough, the list lays stress² on its exclusiveness, although some other avatāras have been alluded to elsewhere in the same chapter.

Other allusions and descriptions in the sources (*e.g.*, महा० II 45, ff, III 273, ब्रह्म० 71, etc.) are not meant to be

¹ *Vide* महा० XII 348 2, etc.

² “इत्येतास्तनवस्तस्य सप्तमन्वन्तरेषु वै । सप्त चैवाभवन्विप्रा यानि संकथिता प्रजाः ॥

exhaustive and exclusive Generally, emphasis is laid on the point that Visnu has passed and shall pass through thousands of avatāras to the extent that even gods cannot exhaust them and that what is described is simply by way of illustration ¹ The Bhāgavata-Purāṇa goes still further and includes not only all gods, men, etc., but the entire beings down to a trifling insect among Visnu's incarnations and designates the popular avatāras as Līlāvatāras ²

2 ACCOUNTS OF VISNU'S AVATĀRAS

I MATSYA (FISH) INCARNATION

(1) Sources.

महाभारत III 190, XII 46, XII 348, etc., मत्स्यपुराण 1 2, etc., भागवतपुराण I 3—15, II 7 12, VIII 24, X 40 17, etc., etc

(2) Brief Description

At the time of a deluge, Visnu became a fish, saved through Manu the germs of beings, etc., from the disaster and also rescued the Vedas

¹ *Vide* हरि० I 41 171 ff “एते चान्ये च बहवो दिव्या देवगुणैर्युता । प्रादुर्भावा पुराणेषु गीयन्ते ब्रह्मवादिभि ॥ यत्र देवा अपि मुह्यन्ति प्रादुर्भावानुकीर्तने । पुराण वक्तते यत्र वेदश्रुतिसमाहितम् ॥ एतदुद्देशमात्रेण प्रादुर्भावानुकीर्तनम् । कीर्तित कीर्तनीयस्य सर्वलोकगुरो प्रभो ॥” etc., ब्रह्म० 104 20 ff “प्रादुर्भावसहस्राणि समतीतान्यनेकश । भूयश्चैव भविष्यन्ति ह्येवमाह पितामह ॥” भाग० I 3 26 ff “अवतारा ह्यपेक्ष्येया हरे सर्वनिवेदिता । यथा विदातिन कुन्या सरस स्यु सहस्रशः ॥” etc

² भाग० I 3 27 ff “अथयो मनवो देवा मनुपुत्रा महौजसः । कत्रा सर्वे हरेरेव सप्रजापतयस्तथा ॥” II 6 42 ff “अह (= ब्रह्मा) भवो यज्ञ इमे प्रजेशा दत्तादयो ये भवदादयश्च । स्वर्लोकपाला खगलोकपाला नृलोकपालान्तर्लोकपाला ॥ गन्धर्वविद्याधरचारुशेखरा ये यक्षरत्नोदगनागनाथाः । ये वा आसीदामृषभा पितृणां दैत्येन्द्र-सिद्धेश्वरदानवेन्द्रा ॥ अन्ये च ये प्रेतपिशाचभूतकृष्णागडयादौऋषद्व्यधीशा ॥ यर्कि च लोके भगवन्महस्वदीज सहस्वह्रलवत्कमावत् । श्रीह्रीविभूत्यात्मवद्भुताणां तत्त्व परं रूपवद्स्वरूपम् ॥ प्राधान्यतो दानृष आमनन्ति लीलावतारान्पुष्पेभ्य भूमि । आपीयतां कर्णकषायशोषाननुकमिष्ये तदिमान्छपेशान् ॥” VIII 5 21 “अह भवो यूयमथोऽधरादयो मनुष्यतिर्यग्द्रुमवर्माजातय । तस्यावताराश्चकला विचर्जिता व्रजाम सर्वे शरणं तमव्ययम् ॥” etc

(3) Details

(a) A fish came¹ into the hands of Manu² who was practising austerities on the banks of a river³ Manu compassionately put it into his gourd and took it to his hermitage Owing to its enormous increase⁴ in size Manu had subsequently to transfer the fish to a number of water-stores, each bigger than the former, and had ultimately to throw it into the ocean On being thrown into the ocean, the fish⁵ informed Manu of the impending deluge when the world would be drowned, and instructed him the course of action that he ought to take for saving himself and others from the disaster In महा० III 190, the fish is said to have asked Manu to build a strong boat on which during the floods he should board along with the seven sages (सप्तर्षि) and should harbour all seeds and germs, whereafter the fish itself, bearing a horn, would come to guide Manu In मत्स्य० 1-2, भाग० VIII 24, etc., the fish is said to have forecasted that

¹ भाग० VIII 24, etc., say that the fish came to Manu's hands with the water that he had picked up for performing the जलसर्पणं rite महा० III 190, etc., say that the fish itself came near Manu and appealed for protection from the mightier sea-animals, whereupon Manu picked it up

² भाग० VIII 24, etc., describe Manu as सत्यव्रत, आश्वदेव, द्रविडेश्वर, etc

³ The river is named as Kṛtamālā in भाग० VIII 24 and as Ōirṇī in महा० III 190

⁴ In मत्स्य० 1, भाग० VIII 24, etc., the growth of the fish is said to be extremely rapid, whereas in महा० III 190, each stage of its growth is said to have taken considerable time

⁵ मत्स्य० 1 says that Manu himself recognised the fish to be Viṣṇu himself when he threw it into the ocean भाग० VIII 24 says that the fish, when being thrown into the ocean, again feigned fear from crocodiles, etc., to Manu's extreme surprise Manu recognised it to be Viṣṇu himself and requested it to disclose the object of that incarnation In महा० III 190, however, the fish's identity with Supreme God is not explicitly said to be revealed to Manu until the end of the deluge

a huge boat,¹ steered by the fish itself bearing a horn, would come to Manu who, along with सप्तर्षि s, etc, should ascend on it, place all germs, seeds and medicinal herbs on it and fasten it to the fish's horn by means of a huge serpent. Everything happened as the fish had forecasted it. Manu, having done everything as previously asked by the fish, tied the boat to the fish's horn, with a cord (Vatārika) according to महा० III 190 and with a huge serpent according to मत्स्य० 2, भाग० VIII 24, etc. Then the fish dragged the boat right up to the end² of the deluge³ and thus saved Manu, etc, from the disaster. Then the fish, praised by Manu and requested by him to impart real knowledge of Supreme principle and other religious matters, is said to have delivered to Manu a series of lectures⁴ on those topics having, according to महा० III 190, first disclosed its identity with प्रजापति ब्रह्मा (and *not with Vishnu* as in other versions). The fish then granted some boons⁵ to Manu and disappeared.

(b) Another important event of this incarnation is the rescue of the Vedas which, however, is not mentioned in

¹ The boat is named as Veda-boat in मत्स्य० 2 and is described as made up of the earth in भाग० I 3 15.

² महा० III 190 says that the fish dragged the boat restlessly for several years, implying that the deluge lasted for several years. Ultimately the fish took the boat to a peak of Himavat mountain and the sages, at the fish's direction immediately fastened the boat to the peak which thence came to be called "शैबन्धन".

³ The deluge is variously called as "वाङ्मोदधिरंजु", "ब्राह्मो नैमित्तिको लय", "ब्राह्मी निशा," etc, in भाग० I 3 15, VIII 24, etc.

⁴ In fact the entire Matsya-Purāṇa from chapter 3 to the end is a dialogue between Manu and the fish महा० III 190, भाग० VIII, 24, etc, also allude to a Matsya-Purāṇa.

⁵ The boons conferred on Manu Supreme Light (प्रतिभा), the power of producing all types of offsprings without attaining stupour (मोह) thereby (महा० III 190), his becoming Varasvata Manu of the age (भाग० VIII 24), etc. मत्स्य० 1 says that even previously Brahman had granted Manu the power of saving the universe from the deluge.

महा० III 190, and is only indirectly¹ mentioned in मत्स्य० 1-2 भाग० VIII 24, etc., give the following Hayagrīva episode in this connection. Brahman became asleep at the beginning of the deluge and from his mouth slipped down the Vedas which demon Hayagrīva, who was standing near-by, picked up. God Viṣṇu had learnt of this act of the demon even before he had assumed the fish's form. After rescuing Manu, etc., he killed the demon and surrendered the Vedas to Brahman who had now risen from his sleep. भाग० II 7 12, etc., simply say that Viṣṇu in the Fish incarnation saved the Vedas that had slipped down from Brahman's mouth during the deluge.

(c) The fish is variously described as शृङ्गी (horned), एकशृङ्गधर (one-horned), रूपेणाद्रिमिवोच्छ्रित² (as high as a mountain), क्षोणीमय³ (made up of the earth), निखिलजीवविकायकेत (abode of entire beings), युगक्षये प्रलयार्थवे विहर्तुकाम (wishing to sport in the flooded ocean at the time of universal destruction), हैम (golden), निर्युतयोजन (many million Yojanas in length), etc., etc.

(4) Remarks

Generally this avatāra ranks first among Viṣṇu's incarnations. Yet in भाग० I 3 and II 7 it finds the tenth place among Viṣṇu's twenty-two incarnations. This avatāra finds no place in many accounts⁴ of Viṣṇu's incarnations and is not included even in some lists⁵ of Viṣṇu's ten incarnations.

¹ "Indirectly" because only the designation of the boat as 'वेदावम्' and the fish's forecast that it would re-establish the Vedas ('वेदान्प्रवरं विध्यामि') after the deluge in मत्स्य० 2 faintly suggest this event in this incarnation during the deluge.

² महा० III 190 38

³ भाग० II 7, 12. Cf. भाग० I 3 15 where the boat, instead of the fish itself, is said to be made up of the earth.

⁴ *Bg*, ब्रह्म० 104, हरि० I 41, महा० II 43-50, etc.

⁵ *Bg*, मत्स्य० 47, etc.

Welfare of people in general and of pious men in particular, saving the Vedas from destruction, etc., are the principal achievements of this incarnation. No allusion is made to Visnu's existence in a woman's embryo, birth, etc., in the case of this avatāra which seems to be a case of mere transformation and is full of superhuman accomplishments.

(5) Origin

The शतपथब्राह्मण I 8 1¹ gives a detailed account of a fish delivering Manu from the flood which agrees in some respects with the Mahābhārata account,² in other respects with the Purāṇic account³ and in few respects with neither. Although the fish in शत० I 8 1 is not explicitly connected with Visnu, Prajāpati or Brahman, still that account is undoubtedly the basis of the Epic and Purāṇic accounts of the Fish incarnation.

Details of similar other deluges are found in the Epics and the Purāṇas and also in many ancient works of foreign languages. But it is not certain which of them is the original.

¹ ममवे ह वै प्रातः । अवनैग्न्यमुदकमाजहृष्येद् पाणिभ्यामवनेजनायाहरन्त्येव तस्यावनेजिजानस्य मत्स्यः पाणीऽऽपदे ॥१॥ स हास्मै वाचमुवाद । बिभृहि मा पारयिष्यामि त्वेति कस्मान्मा पारयिष्यसीत्यौघ इमा सर्वा प्रजा निर्वोढा ततस्त्वा पारयितास्मीति कथं ते भृतिरिति ॥२॥ स होवाच । यावहं शुल्लका भवामो वह्नी वै नस्तावन्नाष्ट्रा भवत्युत मत्स्य एव मत्स्य गितिति कुम्भ्या नाग्रे बिभरासि स यदा तामतिवर्धाऽऽथ कर्तुं खात्वा तस्या मा बिभरासि स यदा तामतिवर्धाऽऽथ मा समुद्रमभ्यवहरसि तर्हि वा अतिनाष्ट्रो भवित्तास्मीति ॥३॥ शश्वद् भूय आस । स हि ज्येष्ठं वर्धतेऽधेत्यी ५ समा तदौघ आगन्ता तन्मा नावमुपकल्प्योपासासे स औघऽऽत्थिते नावमापद्यासे ततस्त्वा पारयितास्मीति ॥४॥ तमेव भृत्वा समुद्रमभ्यवजहार । स यतिर्था तत्समां परिदिदेश तत्तिथी ५ समां नावमुपकल्प्योपासा चक्रे स औघऽऽत्थिते नावमापदे त ५ स मत्स्य उपन्यायुप्सुषे तस्य शृङ्गे नाव पाशं प्रतिमुमोच तेनेतमुत्तर गिरिमतिदुद्राव ॥५॥ स होवाच । अपीतर वै त्वा वृक्षे नाव प्रतिवधीष्व त तु त्वा मा गिरौ सन्तमुदकरञ्जैस्तीद्यावदुदक ५ समवायात्तावत्तावदन्ववसर्पसीति स ह तावत्तावदेवान्त्ववसर्प तदप्येतदुत्तरस्य गिरेर्मनोरवसर्पणमित्यौघो ह ता सर्वा प्रजा निस्वाहापेह मनुरेवैक परिशिषिषे ॥६॥ eto Weber, 1924, p. 75 ff.)

² Eg, the fish taking the boat to a mountain, asking Manu to fasten it to a tree on the mountain, etc.

³ Eg, the fish itself coming into Manu's hands, etc.

II KURMA (TORTOISE) INCARNATION

(1) Sources

महाभारत I 18, XII 46, XII 348, etc , कर्मेपुराण, 1, etc ,
भागवतपुराण I 3, 16, II 7 13, VIII 5-7, X 40 18, etc etc

(2) Brief Description

God Visnu became a tortoise, held steady on his back the mountain Mandara which was sinking and thus enabled gods and demons to proceed unhampered with the churning of the Milky Ocean

(3) Details

(a) Gods, after being repeatedly defeated by demons, made, under Visnu's advice, a truce with the latter and succeeded in moving them to churn the Milky Ocean jointly with themselves with a view to procuring the nectar¹ The mountain Mandara was uprooted and brought on the spot to be used as the churning-rod and a serpent-king² was moved to become the churning-rope भाग० VIII 7, etc , say that thereafter the joint forces of the gods and the demons began, with Visnu's help, to churn the Milky Ocean into which they had previously thrown medicinal plants and creepers As the mountain, being without support, began to sink down, Visnu assumed a tortoise's body, entered the water and held the mountain firm on his back The churning then proceeded briskly and ultimately brought forth several miraculous gems, including the nectar borne by Dhanvantari³ in a pot According to महा० I 18, the demons and the gods including Visnu himself, approached a tortoise-king and requested him to become the support of

¹ Visnu had forecasted that the nectar due to his tactics would ultimately fall to the lot of gods alone

² महा० I 18 describes the serpent-king simply as कर्णीन्द्र, नागराज, etc , whereas भाग० VIII 7, etc , distinctly name him as Vasuki

³ भाग० VIII 8 34, as also I 3 17 and II 7 21 describe Dhanvantari as an incarnation of Visnu

the mountain, even before the churning had actually begun. The tortoise-king agreed and Indra placed the mountain on his back by means of his thunder-bolt. Then the demons and the gods, including Viṣṇu himself, began the churning which ultimately brought forth the nectar. Obviously, in this account the tortoise is not in any way identified with Viṣṇu but is treated as an original creature quite distinct from him. Ultimately, according to all versions, Viṣṇu assumed a damsel's form,¹ deluded the demons and gave away the nectar to the gods alone.

(b) In भाग० VIII 5 ff., Viṣṇu is described as doing many works simultaneously or in quick succession. Thus, he is said to have revived many gods and demons that had been killed in their attempt to bear the mountain Mandara, to have himself brought the mountain on Garuḍa to the ocean, to have joined in the churning at the beginning, to have become a tortoise and held the mountain on his back when it began to sink down, to have infused the gods and the demons with his own strength with a view to enabling them to churn with exceptional velocity, to have seated himself upon the mountain which he held fast with his hands from above (simultaneously when he, as a tortoise, was holding it on his back from below), to have set to rain the clouds for pacifying the atmosphere extremely perturbed by Vāsuki's venomous breathings, to have again himself joined in the churning with a view to the speedy advent of the nectar, and to have done a number of other works simultaneously or in quick succession. Three of his twenty-two incarnations, viz., Kūrma, Dhanvantarī and Mohinī, appear to have occurred almost simultaneously.

¹ This form of Viṣṇu has generally been designated as Mohinī and has been treated as one of his twenty-two avatāras in भाग० I 3 17. In महा० I 18 55 and Vālmīki's Rāmāyaṇa I 45 42ff, however, Mohinī is given as the name not of this form itself but of the mysterious power (Māyā) by means of which Viṣṇu assumed this form.

(c) भाग० VIII 7 describes the tortoise as the primeval tortoise (आदिकच्छप) and compares it to a big island since its back spread over one lakh yojanas. It further says that when the mountain rolled on its back it had its itching sensation quenched.¹

(4) Remarks

The main ultimate object of this incarnation appears to be the speedy coming up of the nectar for the benefit of gods. कूर्म० 1 plainly says that God assumed the form of a tortoise and held up the mountain with a view to the welfare of gods alone (देवानां हितकाम्यया). None of the usual occasions (e.g., destruction of Dharma, oppression of pious men, etc.) seems to have caused this avatāra. Like the Matsya incarnation, the Kūma incarnation, too, appears to be a case of mere transformation. It is not mentioned as to what happened of the tortoise form ultimately.

Generally this is said to be Viṣṇu's second incarnation. Yet it ranks eleventh among Viṣṇu's twenty-two incarnations mentioned in भाग० I 3 and II 7. Thus avatāra, too, finds no place in many accounts² of Viṣṇu's incarnations and is not included even in some lists³ of Viṣṇu's ten incarnations. That महा० I 18 does not seem to identify the tortoise with Viṣṇu has been noted above.⁴

(5) Origin

In शतपथब्राह्मण 7 5 1⁵ and तैत्तिरीयारण्यक I 23,¹ Prajāpati, about to create offspring, is said to have become a

¹ Cf. भाग० II 7 13, where it is also said that the tortoise had a joyous sleep while the mountain rolled on its back.

² *Bṛg*, ब्रह्म० 104, *ह्रि*० I 41, महा० II 43-50, etc.

³ *Bṛg*, मत्स्य० 47, etc.

⁴ Vālmīki's Rāmāyana (I 45, 29ff.) recognises this avatāra of Viṣṇu and gives a brief account generally agreeing with भाग० VIII 7.

⁵ "कूर्ममुपदधाति । रसो वै कूर्मो रसमेवैतदुपदधाति यो वै स एषां लोकानामन्तु प्रविद्धानां पराङ्मसोऽप्यक्षरत्स एष कूर्मस्तमेवैतदुपदधाति यावानु वै रसस्तावानात्मा स एष

to tortoise moving in the primeval waters. This myth may have given rise to the conception of the Tortoise incarnation of Visnu². Prajāpati ranks as the highest god in the Brāhmanical literature and is nearer to Visnu than to Brahman of the Epics and the Purānas. Moreover, the Kūma's association with Madhu (mead) in शतपथब्राह्मण 7.5.1 may be said to form a link to his Purānic identification with Visnu, since Madhu is predominantly associated with Visnu in the Rgveda Samhitā³.

III VARAHA (BOAR) INCARNATION

(1) Sources

महाभारत II 45, III 273, XII 46, 206, 348, etc., मत्स्य-पुराण 247 ff., etc., कूर्मपुराण 6, 16, etc., ब्रह्मपुराण 71, 104, etc.,

इमऽप्य लोका ॥१॥ तस्य यदधर कपालम् । अयं स लोकस्तत्प्रतिष्ठितमिव भवति प्रतिष्ठित-इव ह्ययं लोकोऽयं यदुत्तरं स सा धौस्तद्वयवगृहीतान्तमिव भवति व्यवगृहीतान्तमेव हि यौरथ यदन्तरा तदन्तरितं स एव इमऽप्य लोका इमानेवैतल्लोकानुपपद्यते ॥२॥ तमभ्यनक्ति । दक्षा मधुना घृतेन दधि हैवास्य लोकस्य रूपं घृतमन्तरिक्षस्य मध्वमुष्य स्थेनैवैनमेतद्रूपेण समर्थयत्यथो दधि हैवास्य लोकस्य रसो घृतमन्तरिक्षस्य मध्वमुष्य स्थेनैवैनमेतद्रूपेण समर्थयति ॥३॥ मधुवाता ऋतायतऽइति । यां वै देवतामृगभ्यन्तुषा या यज्ञं सैव देवता सऽक्सो देवता तद्यज्ञस्तद्धेतुन्मध्येवैव त्रिचो रसो वै मधु रसमेवास्मिन्नेतद्देवता गायत्रीभिस्तिष्ठतिस्तस्योक्तो बन्धु ॥४॥ स यत्कूर्मो नाम । एतद्देव रूपं कृत्वा प्रजापतिः प्रजा अस्मज्जत यदस्मज्जताकरोत्तदकरोत्तस्मात्कूर्मं कश्यपो वै कूर्मस्तस्मादाहुः कूर्मां प्रजा काश्यप्य इति ॥५॥ स यः कूर्मोऽसौ स आदित्यो ऽतो (Weber, 1924, page 609 ff)

¹ आपो वा इदमास्तललिलमेव । स प्रजापतिरेकं पुष्करपर्णं समभवत् । तस्यान्तर्मनसि कामं समवर्तत । इदं सृजेयमिति । तस्माद्यत् पुरुषो मनसाभिगच्छति । तद्वाचा वदति । तत् कर्मणा करोति । तद्देवाभ्यन्तुषा । कामस्तद्वये समवर्तताधि । मनसो रेतः प्रथमं यदासीत् ॥१॥

स तपोऽतप्यत । स तपस्तप्त्वा । शरीरमधुनुत । तस्य यन्मां स मासीत् । ततोऽरुणा केतवो वातरथना ऋषय उदतिष्ठन् ॥२॥ ये नखा । ते वैखानसा । ये बाला । ते बालखिल्या । यो रस । सोऽपाम् । अन्तरतः कूर्मं भूतं संपर्णतम् । तमब्रवीत् । मम वै त्वद्मां सः सा । समभूत् ॥३॥ नेत्यब्रवीत् । पूर्वमेवाहमिह-समिति । तत् पुरुषस्य पुरुषत्वम् । स सहस्रशीर्षा पुरुष । सहस्रान् सहस्रपात् । भूत्वोदतिष्ठत् । तमब्रवीत् । त्वं वै पूर्वं स समभूत । त्वमिदं कुरुष्वेति । स (=कूर्मशरीरवर्ती परमारमा as Sāyana explains it) इति आदायाप ॥४॥ अञ्जलिना पुस्तानुपपद्यत् । पृषाद्येति । तत् आदित्य उदतिष्ठत् ऽतो

² Macdonell, *Vedic Mythology*, p 41

³ *E g*, vide I 154 "यस्य त्रीं पूषामधुना पदानि", "विष्णो पदे परमे मध्व उत्स", etc

As to the selection of this particular form, the reason is generally stated that Visnu had a liking for water-sport and that a boar's form was best suited for water sport

All versions say that the Boar raised up the earth on his tusk¹ and placed her on the due level महा० III 273, विष्णु० I 4, भाग० III 13, etc., say that the Boar did this after entering the waters, whereas महा० XII 208, मत्स्य० 218, कूर्म० 6, etc., say that he did this after entering the Rasātala भाग० III 18 says that Visnu after raising up the earth infused her with his own strength मत्स्य० 47 47 says that the Boar divided the ocean into two with his tusk कूर्म० 6 says that Visnu (after resuming his original form) levelled down the earth, made proper adjustment of mountains and then set to task of the new creation² विष्णु० I 4 says that God again created the mountains that had been burnt previously, properly divided the earth into seven Dvīpas and again made the four lokas (भूराद्यान्) as they were in the past हरि० III 39 says that Boar-God allotted respective regions to different gods Ultimately the Boar is said to have disappeared and resumed his original supreme form

महा० II 45, हरि० I 52, etc., say that sage Mārkaṇḍeya witnessed Boar-God's achievement of raising up the earth विष्णु० I 4 says that Sanandana and other sages were present on the occasion भाग० III 13 says that Boar-God, while raising up the earth, greeted several Brāhmanas

(b) In some versions (महा० XII 348, मत्स्य० 47 47 कूर्म० 16, हरि० III 38 ff, भाग० II 7 1, III 13—19, etc) the Hiranyākṣa episode is linked with this incarnation, but notably other versions (महा० III 273, मत्स्य० 247 ff, कूर्म० 6, विष्णु० I 4, हरि० I 41, etc) are silent about it In महा० XII 208, Boar-God is in the authentic readings of the chapter,

¹ Some (e.g., महा० III 273 56) lay emphasis on "a single tusk," others (e.g., मत्स्य० 248 74) on "the tip of a tusk"

² Details of the new creation are given in कूर्म० 7 ff, भाग० III 20 ff, etc

said to have killed a number of demons below the earth merely with his roaring noise¹ and the Hiranyākṣa episode occurs in that chapter only in the passages given as interpolated

भाग० III 13--19 narrates this episode at great length Hiranyākṣa, who along with his elder brother Hiranyakaśipu is identified with Viṣṇu's two gatekeepers Java and Vijaya, who were born on the earth, due to some sage's curse, as primeval demons and sons of Diti and Kāśyapa, was extremely fond of duels. When he could not discover a fit match on the earth and in the heaven, he went to Varuna's city Vibhāvārī and challenged Varuna in a combat. Varuna declined to fight due to old age but advised him to challenge Viṣṇu who, he said, would prove a superior match to Hiranyākṣa. The demon then roamed in search of Viṣṇu and when he learnt from Nārāda about Viṣṇu's having become a boar and entered the Rasātala for raising up the sunken earth, he at once repaired to the Rasātala and challenged Viṣṇu in the form of a boar for a combat. Viṣṇu was enraged and he killed Hiranyākṣa in the duel to give a sense of relief to the gods who had been highly oppressed by the demon. In हरि० III 38-39, the episode occurs when Boar-God has almost finished his creation-work, i.e., long after his raising up the earth.

Hiranyākṣa's death at Viṣṇu's hands is given as the main cause of his brother Hiranyakaśipu's enmity with Viṣṇu in most versions where the Boar incarnation precedes the Man-lion incarnation. In कूर्म० 16, however, the Boar incarnation comes after the Man-lion incarnation and there the episode runs as follows. When Hiranyakaśipu was killed by Nṛsiṃha, Hiranyākṣa was installed as king by Prahlāda. He then propitiated God Śiva and with his

¹ Varāha is said to have roared loudly before raising up the earth also in विष्णु० I 4 (where he is described as सामन्तरध्वनि) and भाग० III 13.

favour subdued the entire world and oppressed gods and sages. He then took the earth down to the Rasātala and made the Vedas powerless. Then, at the request of Brahman and other gods, Viṣṇu became a boar, killed Hiranyākṣa and raised up the earth.

(c) The Boar is described as extremely huge and all-pervading and, Yaśṭiavatāra as he is called, he is pre-eminently associated¹ with Vedas and sacrifices as well as with Vedic and sacrificial rites. In महा० II 45, this incarnation is designated as पौष्करिक वाराह प्रादुर्भाव.

(4) Remarks

This avatāra, too, like the Matsya and the Kūma avatāras, seems to be a case of mere transformation,² no allusion to गर्भवास, जन्म, etc., being made in the accounts thereof. Rescue of the afflicted, establishment of general welfare, destruction of the wicked, etc., appear to be objects of this incarnation.

Usually this ranks as Viṣṇu's third avatāra and comes after the Kūma and before the Nṛsiṃha incarnation. But in कूर्म० 16 it is given as an event subsequent to the Nṛsiṃha incarnation. In भाग० I 3 and II 7 it respectively stands second and first among Viṣṇu's twenty-two incarnations. This avatāra is not included in the list of Viṣṇu's ten incarnations given in मत्स्य० 47 2-47 ff., although it is

¹ *Vide*, for instance, महा० III 273, 54 ff. कृत्वा वराहवपुषः
वाङ्मयं वेदसंमितम् । दशयोजनविस्तीर्णमायत शतयोजनम् ॥ भूत्वा यज्ञवराहो वै
etc मत्स्य० 248 67 ff. वेदपादो यूपदण्डः क्रतुदन्तश्चितीमुखः ॥ अग्निजिह्वो
दर्भलोमा ब्रह्मशीर्षो महातपा । अहोरात्रेक्षणाधरो वेदाङ्गश्रुतिभूषणः ॥ आन्यनासः सुवातुगडः
सामद्योषस्त्वनो महान् । सत्यधर्ममयः श्रीमान्कर्मेविक्रममत्कृतः । प्रायश्चित्तनलो घोरः
पशुशत्रुर्मुखाकृतिः । उर्वगीयिहोमलिङ्गोऽथ बीजौषधिमहाफलः । वाय्वन्तरात्मा यज्ञस्थि-
विकृतिः सोमशोषितः । वेदस्कन्धो हविर्गन्धो हव्यकव्यविभागवान् ॥ प्राग्वशकायां सुतिमा-
ज्ञानादीक्षाभिरन्वितः । दक्षिणाहदयो योगी महासन्नमयो महान् ॥ उपाकर्माष्टरुचकः
प्रवर्गवर्तभूषणः । नानाछन्दोगतिपथोगुह्योपनिषदासनः ॥ छायापत्नीसहायो वै मणिशृङ्गः
इवोच्छ्रितः ॥ etc Compare also महा० II 45, हरि० I 41 ff., III 34,
ब्रह्म० 104, विष्णु० I 4, भाग० II 7 1, III 13 34 ff., etc etc

² *Vide* विष्णु० I 4 “ प्रजापतिः ॥ अकरोत्स्वतन्मन्थी कल्पादिव
यथा पुरा । मत्स्यकूर्माविकीर्तनद्वाराह वपुरास्थितः ॥ ”

briefly alluded to in an earlier couplet (मत्स्य० 47 47) of the same chapter

(5) Origin

Rgveda Samhitā mentions at least twice a Varāha who is killed by Indra

(i) I 61 7 अस्येदु मातु सवनेषु सद्यो मह पितु पपिवान्चावर्वाहा ।

मुषायद्विष्णु, पचत सहीयान्विष्यद्वराह तिरो अद्रिमस्ता ॥¹

(ii) VIII 77 10 विश्वेत्ता विष्णुराभरदुरुक्रमस्त्वेषित ।

शत महिषान्हीरपाकमोदनं वराहमिद्र एमुषम् ॥²

¹ Śaṅkara on I 61 7 — मातुर्द्विद्वारेण सकलस्य जगतो निर्मातुर्महो महतोऽस्य यज्ञस्य सवनेष्ववयवभूतेषु प्रातः सवनादिषु त्रिषु सवनेषु पितु सोमलक्षणमस्र सद्यः पपिवान् । यदाग्नौ हूयते तदानीमेव पानं कृतवानित्यर्थः । तथा चावर्वाहा चारुणि शोभनानि धानाकरभाविहविलक्षणान्यन्नानि भक्षितवानिति शेषः । किं च विष्णुः सर्वस्य जगतो व्यापकः पचतः परिपक्वमासुराणां धनं यदस्ति तन्मुषायत् अपहरन् । महीयान् अतिशयेन शत्रूणामभिभविताद्रिमस्ताद्रैवेजस्य क्षेपकः । एवभूत इद्वस्तिर । तिर प्रास सन् वराह मेघ विध्यत् । अताडयत् । यद्वा । विष्णुः सत्यविवसात्मको यज्ञः । यज्ञो देवेभ्यो निलीय विष्णुरूपं कृत्वेत्याम्नानात् । स विष्णुः । पचतः परिपक्वमस्रधनं यत्तन्मुषायत् । अचूचुरत् । तदनन्तरं दीप्तोपसदात्मना दुर्गरूपाणां सप्तानामह्ना परस्तादासीत् । अद्रिमस्ता सहीयानिद्रो दुर्गायतीत्य तिर प्रास सन् वराहमुकृष्टदिवसरूपं तं यज्ञं विध्यत् । तथा च तैत्तिरीयकम् । वराहोऽयं वाममोषः सप्तानां गिरीणां परस्ताद्विजं वेद्यमसुराणां विभर्तीति । स दुर्भर्पिजलमुद्धृत्य सप्त गिरीन्भिस्त्वा तमहन्निति च । महः । महतः । यद्वा मह इत्येतत्पितुर्विशेषणम् । महः प्रशस्तं पितुर्मित्यर्थः । पपिवान् । पिबतेर्लिट् क्तुः । वराहम् । वरमुदकमाहारो यस्य । यद्वा वरमाहरतीति वराहारः सन् एषोदरादित्वाद्वराह इत्युच्यते । अत्र निरुक्तम् । वराहो मेघो भवति वराहारः । वरमाहारमाहावीरिति च ब्राह्मणमिति । नि० ४ ४ । यज्ञपतो तु वरः च तदहो वराहः ।

² Śaṅkara VIII 77 10 — अस्या ऋचो निरुक्तैतिहासिकमतभेदेन द्विधा योजना । नैरुक्तपक्षे तावत् । हे इन्द्र ता तानि यानि त्वया स्रष्टव्यान्युदकानि सन्ति तानि विष्णुर्ज्यापनशील आदित्य आभरत् । आभरति । लोकाय प्रयच्छतीत्यर्थः । कीदृशो विष्णुः । उरुक्रमो बहुगतिः । किं स्वविरोधेनेत्याह । त्वेषितस्त्वया प्रेषितः । न केवलमुदकान्येवापि च शतं महिषान् शतसंख्याकान्यश्नून् । महिषशब्दो गवादेरप्युपलक्षणः । अथवा शतशब्दोऽपरिमितवचने महिष इति महन्नाम । असंख्यातात्मनो यज्ञान्यजमानेभ्य आभरत् । वदातीत्यर्थः । किं च हीरपाकः हीरपकमोदनं पायसम् । एतच्चरुपुरोडाशादेरुपलक्षणम् । तद्यजमानेभ्य आभरत् । अथवा सर्वार्थं वृष्टिप्रदानद्वारादनं प्राहरत् । किं चेन्द्रो वराहः जलपूर्णं मेघ इतीति शेषः । कीदृशः तम् । एमुषम् । आ इत्यस्य स्थाने छांदस एकारः । आमुषमुदकस्य मोषकमित्यर्थः । निरुक्तपक्ष एवम् । ऐतिहासिकपक्षे वरक ब्राह्मण इतिहास आम्नायते । विष्णुर्यज्ञः । स देवेभ्य आत्मानमतरधात् । तमन्यदेवतां नाविद्विद्रस्त्ववेत् । स इन्द्रमब्रवीत्को भवानिति । तस्मिन् प्रत्यब्रवीदहं दुर्गाणामसुराणां च हता भवास्तु क इति । सोऽब्रवीदहं दुर्गादाहतां त्वं तु यदि दुर्गाणामसुराणां च हता

In his traditional (ऐतिहासिक) explanation of VIII 77 10, Śāyana gives a myth from the Caraka Brāhmaṇa (a work not yet discovered) which with slight variations is found also in Taittirīya Saṃhitā 6 2 4,¹ and Kāthaka Saṃhitā 25 2 2 The myth says that a boar, the plunderer of wealth, kept the goods of the Asuras on the other side of seven hills Indra, plucking up a bunch of Kuśa grass and piercing through these hills, slew the boar Vishnu, the sacrifice, carried the boar off as a sacrifice for the gods In

ततोऽयं वराहो वाममुप एकविंशत्या पुरां पारेऽश्ममयीनां वसति तस्मिन्सुराणां वधं वाम-
मलितं तमिमं जहीति । तस्येन्द्रस्ता पुरो भित्त्वा हृदयमक्रियत् । अथि तत्र यदासीत्-
द्विष्णुराहरविति सोऽयमितिहासोऽस्येदु मातुः सबनेषु विश्वेत्ता विष्णुस्तियाभ्यां प्रतिपादितः ।
तयोर्मध्येऽस्येदु मातुस्त्वित्रं विष्णुना हे ईदं त्वं दुर्गाणां हन्तेत्यात्मानं कथयसि तर्हि वाममुप
वराहमसुरं जहीत्युक्तार्थो विध्यद्वराहमिति पादेन प्रतिपादितः । इदं च विष्णोः त्वं दुर्गा-
दाहर्तंति श्रेष्ठे मया पुराणि जितान्यसुरश्च घातितस्तस्य वामं वामोऽयं त्वत्पुत्रो विष्णुमूर्तिस्तस्य
वराहासुरस्य धनं मुमेष । सोऽयं मुषायद्विष्णु पञ्चतमिति पादेन सूचितः । स किं
पुनरुपहितवानिति तदग्नौच्यते विश्वेत्तंति । हे इदं त्वेष्वितिस्त्वया प्रेरितो विष्णुर्गुरुषु त्वेष्वि-
तस्त्वं दुर्गादाहर्ता किल तर्हि त्वं तस्य धनान्याहरेति त्वया प्ररितं सन् उरुक्रमो भूत्वा
विश्वेत्ता यानि त्वयाहर्तव्यानीत्युक्तानि यानि च तत्र स्थितानि सर्वाण्यभरत् । आभरत् ।
कानि तानीति । शतं महिषान् अपरिमितान्प्रशस्तापद्धार्यान् तेषां बाहनरूपान्महिषान्वा
कीरपाकमोदनं च एकमात्रमेवौदनं चाभरत् । विध्यद्वराहमित्यत्रोक्तोऽर्थश्च चरमपादनेत्युक्ते ।
इदंस्तु वराहं वराह्वारं स्वीकृतासुरसर्वस्वं वराहरूपिणं वैशुपमेमुषनामानमथवैशुपं धनानां
मामोषकं वराहमसुरं हृदयेऽविध्यदिति शेषः ।

यज्ञो देवेभ्यो निज्जायत विष्णु रूपं कृत्वा स पृथिवीं प्राविशत् देवा हस्तान्तस्य
५ रभ्यैऽच्छन्मनिन्द्र उपयुर्पर्यत्यक्रामत्सोऽन्वीत्को माऽयमुपयुर्पर्यत्यक्रमदित्यहं दुर्गं हन्तेत्यथ
कस्त्वमित्यहं दुर्गादाहर्तंति सोऽन्वीदुर्गं वै हन्ताऽथोचथा वराहोऽयं वाममोष
॥२१॥ सप्तानां गिरीणां परस्ताद्विच वेद्यमसुराणां बिभर्ति तं जहि यदि दुर्गं हन्ताऽसीति
स दर्भपुञ्जीलमुद्वृष्ट सस गिरीन्भित्त्वा तमहत्सोऽन्वीदुर्गादां आहर्ताऽन्वीचथा पुतमाहरेति
तमेभ्यो यज्ञ एव यज्ञमाऽहरद्यत्तद्विच वेद्यमसुराणामविन्दन् तदेकं वेद्यं वेदित्वमसुराणाम्
॥२२॥

* देवाश्च वा असुराश्च यज्ञं संयत्ता आमन्तस यज्ञोऽविभेद्यत्तरेऽभिज्ञेष्यन्ति ते मा विम-
धिष्यन्त इति स न्यलयत तं देवा अभिजित्यान्वैच्छन्ते प्रबाहुगिच्छन्त आयस्तस्मिन्द्र
उपयुर्पर्यत्यक्रामत्सोऽन्वीत्को मायमुपयुर्पर्यत्यक्रमदित्यहमेव कृच्छ्रे हन्तेत्यथ कस्त्वमित्यह-
मेव कृच्छ्रादाहर्तंति त्वेसूपो नामायं वराह इत्यन्वीदेकविंशत्या पुरामश्ममयीनां पारे यत्किंचा-
सुराणां वामं वधं तेन तिष्ठति तं जहि य एष कृच्छ्रे हन्तावोचथा इति तस्मिन्द्रो वात्स्य-
प्याभिविद्यन् पराभिनत्सोऽन्वीदेय इतस्तमाहर य एष कृच्छ्रादाहर्तावोचथा इति तं
विष्णुरपासद् आहरद्यज्ञो वै विष्णुर्गुरुषु त्वेषु तद्यज्ञमवृज्जत पशुभिः पशुनिन्द्रियेणैन्द्रिय-
ततो देवा अभवन्परासुरा अभवन् .. etc (Leipzig, 1900, p 103)

Kāthaka Samhitā 25 2 this boar is called *Emūsa* (compare Rgveda Samhitā VIII 77 10—*Emūsā*)

A boar appears in a cosmogonic character in Śatapatha Brāhmana 14 1 2¹ where under the name of *Emūsa* he is stated to have raised up the earth from the waters. In Taittirīya Samhitā 7 1 5,² Kāthaka Samhitā 8 2³ and Taittirīya Brāhmana 1 1 3,⁴ this cosmogonic boar, which raised the earth up from the primeval waters, is described as a form of Prajāpati. This cosmogonic boar is undoubtedly the germ of the Epic and Purāṇic Boar incarnation of Viṣṇu. Whether, as Macdonell holds⁵ this cosmogonic boar is identical with the boar mentioned in Rgveda Samhitā I 61 7, VIII 77 10, Sāyana's Caraka Brāhmana quotation, Taittirīya Samhitā 6 2, 4 and Kāthaka Samhitā 25 2 as a demon, a plunderer of wealth and a victim of Indra, it is difficult to say. The main clue of the dubious identity seems to be the epithet *Emūsa* applied to Indra's victim in Rgveda Samhitā VIII 77 10 and Kāthaka Samhitā 25 2 and to the

¹ अथ वराहविहृतम् । इत्ययग्रऽध्वासीद्वितीयती ह वाऽह्यमग्रे पृथिव्यास प्रादेशमात्री तामेमूष इति वराह उज्ज्वान सोऽस्या पति प्रजापतिस्तेनेवैममेतन्मिथुनेन प्रियेण धाम्ना समर्धयति कृत्स्नं करोति मखस्य तेऽथ शिरो राघ्यासे देवयजने पृथिव्या मखाय त्वा मखस्य त्वा शीर्षाऽह्यसावेव बन्धु ॥११॥ (Weber, 1924, p 102b).

² आपो वा इदमग्रे सलिलमासीत्स्मिन्प्रजापतिर्वार्युर्भूत्वाऽचरत्स इमामपश्यत्ता वराहो भूत्वाऽहर्त्तां विश्वकर्मा भूत्वा व्यमादत्साऽप्रथत सा पृथिव्यभवत्तत्पृथिव्यै पृथिवित्व तस्यामश्राम्यत्प्रजापतिस्स देवानसृजत वसुभुवनादित्यान्ते देवा प्रजापतिमब्रुवन्प्रजायामहा इति सोऽब्रवीत् ॥१४॥ etc

³ आपो वा इदमासन्सलिलमेव स प्रजापतिर्वराहो भूत्वोपन्यमज्जत्स यावन्मुखमासीत्तावर्ता मृदमुदहरत्सेयमभवद्यद्वाहविहृतं भवत्यस्यामेवैने प्रत्यक्षमावत्ते वराहो वा अस्यामज्ज पश्यति तस्मा इयं विजिहीते यद्वाहविहृतं भवति तदेवाग्रमवरुण्ये यत्तदादत्त तद्वदितिर्यदप्रथत तत्पृथिवी यदभवत्तद्भूमिर्यद्वाह विहृतं भवति etc (Leipzig, 1900, p 84)

⁴ आपो वा इदमग्रे सलिलमासीत् । तेन प्रजापतिरश्राम्यत् ॥१८॥ कथमिदं ऋत्यादिति । सोऽपश्यत्तत्पृक्करण्यां तिष्ठत् ॥ सोऽमन्यत अस्ति वै तत् । यस्मिन्निदमवितिष्ठतीति । स वराहो रूपं कृत्वोपन्यमज्जत् । स पृथिवीमथ आर्हत् । तस्या उपहृत्योदमज्जत् । तत्पृक्करण्यांऽप्रथयत् । यदप्रथयत् । तत्पृथिव्यै पृथिवित्वम् । अभुङ्गा इदमिति । तद्भूम्यै भूमित्वम् । तां दिशोऽनु वातन्समवहत् etc

⁵ Vedic Mythology, p 41

cosmogonic boar in Śatapatha Brāhmana 14.1.2. But then it is not quite clear as to how a demon,¹ victim of Indra, came to be identified with Supreme Divinity, Prajāpati or Viṣṇu. Hence the identity upheld by Macdonell rests on most uncertain grounds. Possibly the two boars of the Vedic literature are distinct from each other and of them the cosmogonic boar is the germ of Viṣṇu's Boar incarnation of the later literature. By associating the Boar incarnation with Vedas and Vedic rites, the Epics and the Purāṇas indeed seem to attribute a Vedic origin to the incarnation.

IV NṚSIMHA (MAN-LION) INCARNATION

(1) Sources

महाभारत II 46, III 273, XII. 46, 348, etc., मत्स्यपुराण 47, 161-163, etc., कूर्मपुराण 16, ब्रह्मपुराण 71, 104, etc., विष्णुपुराण I 16—20 etc., हरिवंश I 41, III. 41—47 etc., भागवत-पुराण I 3.18 II 7.14, VII 2—10, X 40.19, etc., etc.

(2) Brief Description

Viṣṇu became a Man-lion and put to death demon Hiranyakāśipu whose reign of terror had extremely oppressed gods and pious men.

(3) Details

(a) Hiranyakāśipu, a primeval demon and elder brother of Hiranyākṣa, was, as the result of his severe penances² covering several thousand years, granted by Brahman a

¹ Even in some Purāṇas we find a demon called Varāha who can in no way be said to be identical with Viṣṇu's Boar incarnation. *Vide*, for instance, हरि० I 43 मत्स्य० 172 ff, etc., where this Varāha, among others, is said to fight against Viṣṇu in the Tārakāmaya War. In हरि० I 54 this demon Varāha is said to have been born as wrestler Cāpūra during the Kṛṣṇa incarnation.

² भाग० VII 2, etc., say that Hiranyakāśipu practised the austerities with a view to gaining strength enough to revenge his brother Hiranyākṣa's death on Viṣṇu.

boon which insured his unrivalled supremacy over all and safety, during days and nights and in all spheres, from gods and other creatures of Brahman, from all weapons, missiles, dry and wet substances, etc., from the curses of sages, etc. Some versions,¹ however, record an exception in the boon, *viz*, that only he who could destroy Huanyakaśipu and his entire forces with a mere blow of hand should become his killer. Strengthened by Brahman's boon, the demon deprived gods of their majesty, prohibited all worships and sacrifices offered to them and extremely oppressed them and pious men in many ways. The Gods then complained to Brahman who, however, referred them to Viṣṇu who alone, he said, was competent enough to kill the demon. Viṣṇu, when approached, undertook to kill the demon. He² became a Man-hon,³ (*i.e.*, half-man and half-lion), repaired to Huanyakaśipu's court and killed the demon along with his environments.

In some versions (महा० III 273, हरि० III 41, कूर्म० 16, etc) Viṣṇu first becomes a Man-hon and then goes to the demon's court, in others (हरि० I 41, मत्स्य० 161, etc) he first

¹ *E.g.*, हरि० I 41 52 (पाणिप्रहारेणैकेन सभृत्यवलवाहनम् । यो मां नाशयितुं शक्तः स मे भृत्युर्भविष्यति), III. 41, etc

² Viṣṇu, when he came to the demon's court, is described as ओंकारसहाय (*i.e.*, accompanied by Omkāra) in हरि० III 41, मत्स्य० 161, etc

³ The Man-hon is described in हरि० I 41 76 ff as नरस्य कृत्वार्धतनुं सिंहस्यार्धतनुं प्रभु । नरसिंहेन वपुषा पाणिं संस्पृश्य पाणिना ॥ जीमूतघनसंकाशो जीमूतघननिस्वन ॥ जीमूतघनदीप्तौजा जीमूत इव वेगवान् ॥ etc., in भाग० VII 8 10ff as—नमृग नमानुषम् नमृगेन्द्ररूपम् ॥ समुत्थितोऽग्रतो वृषिहरूपस्तदल भयानकम् । प्रतप्तवामीकरचण्डलोचनं स्फुरत्सटाकेसरनृभिमाननम् ॥ कपालदंष्ट्रं करवालचपलक्षुरांतजिह्वं श्रुकुटीमुखोल्लस्यम् । स्तब्धोर्ध्वकर्णं शिखिदराद्भु-
तभ्यान्तस्यनासं हनुभेदमीषणम् ॥ विविल्पृथात्कायमदीर्घपीवरपीवोरुवत् स्थलमल्पमध्यमम् । चद्रांशुगौरैश्छुरित तनूहैर्विष्णुभुजानीकशतं नखायुधम् ॥ दुरासदं सर्वनिजेतरायुधप्रवे-
गविद्रावितदैत्यदानवम् ॥ etc *Vide* also महा० II 46, हरि० III 41ff, etc. All persons in the demon's court are said to have been astonished to see the Man-hon there.

goes to the demon's court and then assumes the Man-lion's form. In most versions the Man-lion is said to have torn asunder Hiranyakaśipu's body with his claws, in some (हरि० I 41, etc), however, he is said to have killed the demon with a single hand (एकपाणिना). As to how the incarnation ended, मत्स्य० 163 says that Viṣṇu, after killing Hiranyakaśipu, stabilised his Man-lion's form (नारसिंहं वपुः स्थापयित्वा), resumed his original form (पौराण्यं रूपमास्थाय) and went on an eight-wheeled vehicle to his abode on the northern shore of the Milky Ocean, कूर्म० 16 says that Viṣṇu left the Man-lion's form and resumed his original Nārāyaṇa form, भाग० VII 10, 31 says that the Man-lion ultimately disappeared and became invisible to all beings.

(b) The description of this avatāra in कूर्म० 16, which, unlike other versions, makes the Nṛsiṃha incarnation precede the Varāha incarnation, commences with some details which are not found in other versions. When gods, with Brahman at their head, appealed to Viṣṇu for Hiranyakaśipu's destruction, Viṣṇu created a "Puruṣa"¹ (man) and bade him repair instantly to the demon's place, to kill the demon and then to return immediately to Viṣṇu's abode. The Puruṣa accordingly rode on Garuḍa to the demon's city. His sight put to confusion the demon's followers who took him to be Viṣṇu himself or Viṣṇu's son at least.² The Puruṣa vanquished the demon's four sons including Prahlaḍa but had to escape on Garuḍa to Viṣṇu's abode in extreme distress when the demon himself came forward and kicked him. Then Viṣṇu himself became a Man-lion, went to Hiranyakaśipu's city, vanquished, among others, Hiranyākṣa, having baffled the Pāśupata missile

¹ He is described as 'मेरुपर्वतवर्ष्मणि शिरस्य भयानकम् । शङ्खचक्रगदा-पाणि, etc.' and further as 'पुत्रं नारायणोद्भूतं विष्णु वासुदेव यथात्मम् ।' etc.

² "अथ स देवो देवानां गोप्ता नारायणो रिपुः । अस्माकमव्ययो नूनं तत्सुतो वा समागतः ॥"

aimed by him and ultimately tore asunder Hiranyakāśipu with his claws. Hiranyākṣa escaped while other demons were killed by the lions that emanated from the Man-lion's body (नृसिंहदेहसम्भूतैः सिंहैः etc.)

(c) The Prahrāda episode is usually linked with this incarnation. A few versions (e.g., महा० II 46, हरि० I 41, etc.), however, make no mention of Prahrāda at all.

In हरि० III 43, मत्स्य० 162, etc., Prahrāda, Hiranyakāśipu's son, is not described as a born devotee of Viṣṇu but is said to have begun to admire the Man-lion only when he saw him in Hiranyakāśipu's court and to have subsequently disclosed the Man-lion's supreme character to Hiranyakāśipu. No further details about Prahrāda are given there. In कूर्म० 16, Prahrāda, at his father's command, is said to have even fought with the Man-lion for whom he incurred high regard only after he himself and Hiranyākṣa were vanquished by him. Thereafter he guessed the Man-lion's real character, revealed it to his father and to other demons and tried, in vain, to dissuade them from fighting against the Man-lion.¹

भाग० VII 2—10, विष्णु० I 16—20, etc., which make the Prahrāda episode the supreme event in this incarnation, depict Prahrāda as a born² devotee of Viṣṇu.

¹ Hiranyākṣa, कूर्म० 16 adds, succeeded Hiranyakāśipu to the throne and, he, on his death subsequently at Boar-God's hands, was succeeded by Prahrāda. Prahrāda then devoted himself to Viṣṇu and ruled piously. Subsequently, however, due to a Brāhmana's curse, he gave in with Viṣṇu and even fought with him. When Viṣṇu vanquished him, his devotion to Viṣṇu again grew and ultimately he, as a unique devotee, attained union with Viṣṇu's supreme form.

² In भाग० VII 7, Prahrāda to his friends narrates as to how he incurred this supreme knowledge and devotion to Viṣṇu. When Hiranyakāśipu had gone away to practise austerities, Indra captured Kāśadhū, Hiranyakāśipu's wife, who was pregnant, with a view to killing her issue. At Nārada's assurance that her son would be a great devotee of Viṣṇu, Indra respectfully set her free.

In भाग० VII 4, Viṣṇu is said to have assumed the gods that had sought his shelter that he would destroy Hiranyakaśipu as soon as he would begin to torment Prahrāda. Hiranyakaśipu strained his every nerve to make Prahrāda give up his devotion to Viṣṇu,¹ the killer of Hiranyākṣa. He employed some teachers who delivered to Prahrāda a series of lectures against devotion to Viṣṇu. The lectures had not the desired effect, on the contrary Prahrāda's contact made all demon-boys, his fellow-students, devotees of Viṣṇu and Prahrāda began to preach his creed to his teachers and even to Hiranyakaśipu himself. This highly enraged the demon-king and he subjected Prahrāda to a series of tortures², but Prahrāda, due to Viṣṇu's favour, miraculously survived them all. Hiranyakaśipu then entered into a discussion with Prahrāda regarding Viṣṇu's supreme and omnipresent character. Hearing Prahrāda's reply that Viṣṇu was all-powerful and existed everywhere, even in the post near-by, Hiranyakaśipu furiously kicked at the post from which Viṣṇu, in a Man-lion's form, came out to the astonishment of all. The demon attacked the Man-lion and displayed unique skill in fighting, but ultimately the Man-lion felled him down at the gate and tore him asunder with his claws. The Man-lion's fury was ultimately pacified by Prahrāda who had pleased Viṣṇu with his unique devotion from the very beginning.

Then Nārada took her to his hermitage and taught her real knowledge and supreme principles of Dharma which Prahrāda, then in her womb, picked up to become, when born, a great devotee of Viṣṇu.

¹ भाग० VII 5 says that Hiranyakaśipu suspected Prahrāda's devotion to Viṣṇu to have been due to some fraud from gods or other enemies.

² *Eg.*, striking by weapons, snake-bites, causing big elephants to throw him down from cliffs of mountains, setting fire deadliest poisoning, strokes of Kṛtyā, employment of Śambarā's Māyā, binding over by serpents and then throwing into the ocean, etc., etc.

विष्णु० I 16—20, which generally agrees with the Bhāgavata account of Prahīrāda up to the point of tortures, says that Prahīrāda was finally bound over with serpents and then buried deep into the ocean underneath big mountains, when Viṣṇu personally came to the spot, rescued Prahīrāda and granted him several boons. Prahīrāda then returned and made obeisances to his father who was moved to tears of joy to see his son alive after that torture and embraced him. Prahīrāda then attended on his father and preceptor with all his heart. Thus this version depicts Hiranyakaśipu and Prahīrāda as ultimately compromised and although it makes an extremely brief allusion¹ to Hiranyakaśipu's death at Nṛsiṃha's hands, it does not enter into any details of further difference between the father and the son, Hiranyakaśipu's kicking at the post, the Man-hon's appearance therefrom, the duel between the demon and the Man-hon, etc., etc.

(4) Remarks

Like the preceding three avatāras, this too seems to be a case of mere transformation, since birth, etc., of Nṛsiṃha is generally not alluded to. A faint allusion to Nṛsiṃha's birth is, however, found in मत्स्य० 47 238-239² where it is said that Viṣṇu was born as Nṛsiṃha on the shore of the ocean in the fourth Yuga and that Rudra was Viṣṇu's priest in this incarnation.

Usually this ranks as Viṣṇu's fourth avatāra and comes after the Varāha and before the Vāmana. In कूर्म० 16, this avatāra, as noted above, is given as an event prior to the Varāha incarnation. In मत्स्य० 47, this stands second among Viṣṇu's three divine (दिव्य) incarnations, the other two being the Nāīāyana and the Vāmana.

¹ "पितर्युपरति नीते नरसिंहस्वरूपिणा । विष्णुना सोऽपि दैत्यानां मैत्रेयामृतपतिस्ततः ॥" विष्णु० I 20 32

² "युगाख्यायां चतुर्थ्यां तु आपन्नेषु सुरेषु वै ॥ संभूतस्तु समुद्रान्ते दिग्गयकशिपोर्वधे । द्वितीये नरसिंहाख्ये रुद्रे ह्यसीत्पुरोहितः ॥"

In भाग० I 3 and II 7 this finds respectively the fourteenth and the twelfth place among Viṣṇu's twenty-two incarnations

(5) Origin

It is difficult to trace the germ of this incarnation in the earlier literature. Mention is, however, made of Puruṣa-Vyāghras (= man-tigers) in शुक्लयजुर्वेदसंहिता 30 8¹ and शतपथब्राह्मण 13 2 4². Such mentions probably mark the primitive conception that man does not essentially differ from the beast. In the Matsya, Kūma and Varāha incarnations, Viṣṇu appears entirely as a beast, in the Nṛsiṃha incarnation he appears to have advanced towards humanity, inasmuch as he is said to have become half-man and half-lion. The mention of man-tigers noted above might have suggested the idea of the Man-lion incarnation, though the details of the incarnation remain untraced in earlier works.

On Rgveda Samhitā VIII 14 13,³ Sāyana gives a myth⁴ saying that Indra had to kill Namuci at the juncture of day and night with foam (a substance neither dry nor wet) because the demon had been granted immunity from death during day and night and from missiles dry and wet. If this myth, which is not found in the Brhaddevatī,

¹ नदीभ्यः पौञ्जिष्ठमृत्तीकाभ्यो नैषादः पुरुषव्याघ्राय २ दुर्मदः गन्धर्वाप्सरोभ्यो ब्राह्म्यः प्रयुग्मभ्यः उन्मत्तः २ सर्पदेवयजनेभ्योऽप्रतिपदमेभ्यः कितवमीर्यताया अकितवं पिशाचेभ्यो विदलकारां वातुधानेभ्यः कण्टकीकारीम् ॥८॥

² स (= प्रजापतिः) यद्व्याप्त्यै स २ स्थापयेत् । समध्वानः क्रामेयुः समन्तिकं ग्रामयोग्रामान्तौ स्थातां नञ्जीकाः पुरुषव्याघ्राः परिमेषिणः आग्न्याधिन्यस्तस्कृता अरययेष्वा जयेरन्यदारययैवध्वानः क्रामेयुर्विदूरं ग्रामयोग्रामान्तौ स्थातामृत्तीकाः पुरुषव्याघ्राः परिमेषिणः आग्न्याधिन्यस्तस्कृता अरययेष्वाजयेरन् ॥२॥, etc (Weber, 1924, p. 967)

³ “अपां केनेन नमुचे, शिर इंद्रोदवर्तय । चित्रा यदजयः स्पृष ॥”

⁴ “पुरा किंल्लोऽद्धराञ्जित्वा नमुचिमसुरं ग्रहीतुं न शशाक । स च युध्यमानस्तेनाखरेण जग्रहे । स च गृहीतमिदमेवमबोचत् । त्वां विष्टजामि रात्रावद्वि च शुष्केणाद्र्येण चायुधेन यदि मां मा हिंसीरिति । स इदंस्तेन विष्टः सन्नहोरात्रयोः सन्धौ शुष्काद्रं विलक्षणं केनेन तस्य शिरश्चिच्छेद । अयमर्योऽर्योऽपि प्रतिपाद्यते । etc

is authentic, herein may be traced the germ of the boon granted by Brahman to Hiraṇyakaśipu

V VAMANA (DWARF) INCARNATION

(1) Sources

महाभारत II 47, III 12, 273, XII 46, 348, etc., हरिवंश I 41, 48, 52, III 31, 48—72, etc., मत्स्यपुराण 47, 244 ff etc., कूर्मपुराण 17, 51, etc., ब्रह्मपुराण 71, 104, etc., भागवतपुराण I 3 19, II 7 18, VIII 15—23, X 40 19, etc., etc

(2) Brief Description

Viṣṇu became a dwarf, went to Bali's sacrifice and when granted space measuring his own three steps, assumed a huge form, traversed the entire universe in his three steps and thereby deprived Bali and his followers of their dominion and supremacy over gods

(3) Details

(a) Bali, an extraordinarily powerful¹ demon-king and son of Virocana and grandson of Prahrāda, vanquished Indra and other gods, deprived them of their dominion and divine status and himself became the supreme monarch of all the worlds. Aditi, the mother of gods, who was extremely pained at her sons' distress, practised severe austerities² as the result³

¹ In हरि० III 48, 63, etc. Bali is said to have gained this power due to a boon granted by Brahman. In almost all versions he is described as one of righteous and religious temperament and as highly attached to Brāhmanas. In मत्स्य० 245 "कूर्म० 17, etc., he is also said to have lately devoted himself to Viṣṇu at Prahrāda's instructions. कूर्म० 17 even says that Bali held his celebrated sacrifice in honour of Viṣṇu himself, the lord of sacrifices

² भाग० VIII 16 ff says that Aditi, at her husband Kaśyapa's suggestion, observed the *Payovrata* vow

³ हरि० III 67, however, says that all gods, headed by Kaśyapa and Aditi, practised penances, at Brahman's suggestion, having gone to Viṣṇu's abode known as Amṛta, north of the Milky Ocean, as the result of which Viṣṇu promised to be born as Vāmana, son of Kaśyapa and Aditi

of which Visnu manifested himself to her and undertook to be born as her son for rescuing India, etc. Accordingly, Visnu, having duly dwelt in Aditi's womb,¹ was born² as her son, to the triumph of all gods कूर्म० 17,³ भाग० VIII 18,⁴ etc., say that Visnu when born was in his usual supreme form (four-handed, bearing the usual conch, discus, mace and lotus, etc.) and was attended on by all gods भाग० VIII 18 further says that as soon as Aditi blessed him, he changed his form and became a dwarf कूर्म० 17, however, seems to say that he became a dwarf when, at a much later stage, he repaired to Bali's sacrifice हरि० III 70, मत्स्य० 245, etc., say that Visnu was born as a dwarf and that he went to Bali's sacrifice, at the request of gods, immediately after his birth कूर्म० 17, भाग० VIII 18, etc., say that his

¹ भाग० VIII 17 21 ff (अदितिर्दुर्लभं लब्ध्वा हरेर्जन्मात्मनि प्रभो । उपाधावत्पतिं भक्त्या परया कृतकृत्यवत् । स वै समाधियोगेन कश्यपस्तदुद्बुध्यत ॥ प्रविष्टमात्मनि हरेरशे ह्यवितथेक्षया । सोऽदित्यां वीर्यमायत्त तपसा चिरसेवृतम् ॥ समाहितमना राजन्दारूपयस्मि यथानल । etc., says that a part of Visnu first entered Kasyapa's body and thereafter was transferred to Aditi's womb through Kasyapa's semen Visnu's existence in Aditi's womb is exalted at great length in almost all versions मत्स्य० 244, कूर्म० 17, etc., say that various evil omens occurred at that time at Bali's place and Prahrāda, discerning therefrom Visnu's impending incarnation to be meant to overthrow Bali's power and supremacy successfully moved Bali to devote himself to Visnu

² महा० III 273, हरि० III 69, etc., say that Aditi gave birth to Vāmana a thousand years after conception भाग० VIII 18 5 ff thus describe the day of Vāmana's birth - श्रोणाया श्रवणद्वादश्यां सुहृत्तेऽभिजिति प्रभु । सर्वे नक्षत्रताराद्याश्चक्रुस्तज्जन्म दक्षिणम् ॥ द्वादश्यां सवितासिद्धमभ्यदिनगतो नृप । विजया नाम सा प्रोक्ता यस्यां जन्म बिदुर्हरे ॥ etc

³ असूत कश्यपाच्चैने देवमातादिति स्वयम् ॥ चतुर्भुज विशालाक्षः । श्रीवत्स-
ङ्कितवत्सम् । नीलमेघप्रतीकाश आजमानं श्रिया हृतम् ॥ etc

⁴ चतुर्भुज शखगदाब्जचक्र पिशगवासा नलिनायतेक्षण । प्रयामावदातो
भयराजकुंडलत्विलोहपञ्चद्वीवदनाम्बुज पुमान् ॥ श्रीवत्सवत्ता बलयागदोहसत्किरीटकांचीरुण-
चारुनूपुर ॥ मधुव्रतव्रातविष्णुष्टया स्वया विराजिन श्रीवनमालया हरि । प्रजापतेर्वैश्रवतम
स्वरोचिषा विनाशयन्कठनिविष्टकौस्तुभ ॥ etc

Upanayana¹ (Sacred Thread Ceremony) and other rites were performed before he went to Bali's sacrifice.

The sacrifice held by Bali is said to be an *Aśvamedha* sacrifice in हरि० III 70, etc., as also in भाग० VIII 18 where it is located in the region known as *Bhrgukaccha* lying on the north bank of the *Naimadī* कूर्म० 17 says that Bali held his sacrifice (not named) in honour of Almighty Viṣṇu, the lord of sacrifices महा० III 273, हरि० III 70, etc., say that Vāmana went to the sacrifice along with Brhaspati, कूर्म० 17 says that he went there under his preceptor² Bharadvāja's instructions. Bali cordially welcomed Vāmana at the sacrifice and offered to give him whatever he demanded. Vāmana paid glorious tributes to Bali and to his ancestors for their celebrated generous nature and begged of Bali space measuring Vāmana's own three steps³ हरि० III 71, मत्स्य० 246, कूर्म० 17, etc., say that Bali instantly agreed to do so, भाग० VIII 19, etc., say that Bali acceded to Vāmana's demand after trying unsuccessfully to move him to make a bigger demand हरि० III 71,⁴ मत्स्य० 246, भाग० VIII 19 ff., etc., say that Śukra, Bali's priest, at once detected Vāmana's trick, informed Bali about it and tried to dissuade Bali from granting Vāmana's demand. Bali, however, remained

¹ भाग० VIII 18 14—19 gives details of this ceremony in which most of the major gods are said to have participated.

² Contrast मत्स्य० 47 240 where Vāmana's priest is named as Dharmā and not as Bharadvāja or Brhaspati.

³ हरि० III 71 says that Vāmana represented to Bali that he wanted the space measuring his own three steps for making a sacrificial fire-place for his preceptor.

⁴ In हरि० III 71 even Prahrāda is said to have tried to dissuade Bali from granting anything to Vāmana. Contrast भाग० VIII 22 (where Prahrāda is said to have excessively triumphed at Bali's deception at Viṣṇu's hands which he regarded as a unique favour from Supreme God), मत्स्य० 245 and कूर्म० 17 (where Prahrāda advises Bali to devote himself to Viṣṇu with all his heart).

him on his word¹ and expressed his triumph in being begged of by Viṣṇu

No sooner had Bala confirmed² his grant than Vāmana left off his dwarf's form, assumed a huge³ form and took his three steps. According to most versions he in his three steps traversed the three worlds (designated in महा० III 12, कूर्म० 17, etc., as the earth, the heaven and the sky). According to महा० III 273, हरि० I 41, etc., however, he traversed only the earth. भाग० VIII 20ff. says that Vāmana traversed the entire universe in his two steps only and that nothing remained for the third step. Then he contracted his huge form, made Garuḍa bind Bala over with Vaiṣṇava's fetters and rebuked him for not being able to give space, as promised, for his third step. Then Bala, to bear testimony to his sincerity and truthfulness, triumphantly asked Vāmana to put his third step on his head. When subsequently requested by Vindhyaīvala, Bala's wife, and even by Brahman, to release Bala, Vāmana replied that his treatment towards Bala was, as it were, a unique favour which seldom comes to the lot of a devotee. He praised Bala for his truthfulness, granted him several boons⁴ and asked him to live⁵ for a fixed period in the Nether Sūtaḷa world as a true devotee of Viṣṇu. Prahlaḍa then expressed his gratitude to Vāmana for this favour on Bala and went to the Nether world along with Bala and

¹ भाग० VIII 20 says that Sukra even cursed ("मच्छासमातिगो यत्स्वमचिराद् अश्रयसे श्रियं" etc.) Bala for disobeying his advice but still Bala remained firm on his word.

² हरि० III 71, भाग० VIII 20, etc., say that Bala confirmed his grant by means of an Uḍaka ceremony.

³ *Vide* almost all the versions for a detailed description of the huge form and its activities while taking the three steps.

⁴ One of the boons amounted to make him the Indra of the Sūtaḷa age.

⁵ God also said that Bala would always find Him near himself in the Nether world.

others¹ कूर्म० 17, which generally agrees with these details, does not make Visnu rebuke Bali or to claim further space (as the three steps had already been taken) nor does it allude to the binding over of Bali. Bali, on observing Vāmana's huge form, is here said to have, of his own accord, reconfirmed his previous grant and to have surrendered himself to Vāmana who then bade him repair to the Nether Pātāla world and to live there as his pious devotee हरि० III 72 says that Vāmana, after taking his three steps, bound² Bali over with snake-fetters and bade him go below the earth and to rule over the Suta Pātāla world, assuring him of his supreme favour provided he never disobeyed India. Further Visnu, pleased at Bali's constant devotion on the lines prescribed by Nārada, sent Garuda to remove his serpent-fetters and granted him several boons.

Vāmana then gave back to India the three worlds according to मत्स्य० 246, कूर्म० 17, 51, etc, the heaven (त्रिविध or त्रिविष्टप) according to हरि० I 41, भाग० I 3, 19, VIII 23, etc, and the earth (पृथिवी or मेदिनी) according to महा० III 273, हरि० III 48, 72, etc. He also killed numerous demons,³ that attacked him from all sides on observing his change of form,

¹ Ultimately Vāmana is said to have bidden Śukra to complete the sacrifice.

² The binding over of Bali is also referred to in ब्रह्म० 71, 104, etc. The myth of Balibandha is older than Patañjali (second century B C) who in his Mahābhāṣya alludes to the staging of a play on the theme.

³ Vide हरि० I 41, III 72, ब्रह्म० 104, etc, for the long list of these demons. Generally Vāmana himself is said to have killed them all. But in भाग० VIII 21, Visnu's followers (viz., Nandī, Sunanda, Jaya, Vijaya, Prabala, Bala, Kumuda, Kumudākṣa, Visvakṣena, Patatrīṇāt, Jayanta, Śrutadeva, Puṣpaṇṭa and Śātvata) are said to have enormously destroyed these demons, who without Bali's sanction, attacked Vāmana when he contracted his huge form after taking the three steps. Ultimately Bali moved them to withdraw, saying that it was now futile to fight with the time-favoured gods.

either before or after taking his three steps according to different versions. After finishing these achievements, Vāmana is said to have disappeared and become invisible in कूर्म० 17, etc., and to have gone to the heaven in हरि० III 72, etc., भाग० VIII 23, etc., say that ultimately Brahman made Vāmana Upendra, lord of Lokas, Lokapālas, Vedas, All-Gods, Dharma, Glory, Prosperity, Auspicious Ceremonies, Vows, Heaven and Salvation, whereafter Indra and other gods took him to the heaven in the aerial car and thereby prospered immensely.

(b) In हरि० III 31, no mention of Bali is made and instead Hiranyakaśipu is said to have played his part. Hiranyakaśipu and his son were holding a sacrifice with Śukra as their priest. Hiranyakaśipu proclaimed that he would fulfil the desires of any person that came at the sacrifice. Viṣṇu in the form of a dwarf came there and, on being granted by Hiranyakaśipu space measuring his own three steps, assumed a huge form and by taking three steps deprived the demon of his dominion. All demons with their entire environments, then entered the Pātāla hole and the gods were thus raised up. Thus in this version,¹ Hiranyakaśipu plays the part attributed to Bali in other versions.

(c) In महा० III 12 26 ff.,² in the course of his praise of Kṛṣṇa, Aṅgana alludes to his having become a boy, son of Aditi and younger brother of Indra, to his having traversed the three worlds in three steps and to his having ascended the sun's chariot, in that course, to outshine the sun himself. This passage makes no reference to Bali or any other demon.

¹ It is to be noted, however, that spiritual significance has been attached to this description by commentator Nīlakantha who also takes the name of Hiranyakaśipu to stand for that of Bali.

“अदितेरपि पुत्रत्वमेत्य यादवनन्दन । त्व विष्णुरिति विख्यात इन्द्रादवरजो विभु ॥
शिष्टभूत्वा दिव खं च पृथिवीं च परतप । त्रिभिर्विक्रमयौ कृष्ण क्रान्तवानसि तेजसा ॥
संप्राप्य दिवमाकाशमादित्यस्यन्दने स्थित । अत्यरोचश्च भूतात्मन्भास्करं स्वेन तेजसा ॥”

Although much importance cannot be attached to this passage since it is a brief summary, and not a detailed narrative, of Kṛṣṇa's past achievements, still the passage, due to its omission of Bali and other demons, seems to be more akin to the Rgvedic descriptions of Viṣṇu's taking three steps

(4) Remarks

Existence in womb, birth,¹ etc., (but not death), are generally attributed to Viṣṇu in this incarnation. Thus in this respect this avatāra stands apart from the first four avatāras which are cases of mere transformation. In this incarnation Viṣṇu seems to have shaken off his animality altogether and to have considerably advanced towards humanity. The achievements of the incarnation are, however, almost all superhuman as in the case of the first four incarnations. Rescue of the favoured alone seems to be the purpose of this incarnation.

Generally this ranks as Viṣṇu's fifth incarnation. Yet in मत्स्य० 47-240, this finds the third place and is said to have occurred in the seventh Tretā. This stands seventh and last in the list of Viṣṇu's seven incarnations given in कूर्म० 51, where it is said to have occurred in the Vaivasvata age. In भाग० I 3 and II 7 it respectively ranks fifteenth and fourteenth among Viṣṇu's twenty-two incarnations.

(5) Origin

The feat of taking three steps is attributed to Viṣṇu in a number of hymns in the Rgveda Samhitā. Probably this description originally referred to the course of the sun, although from the time of the Brāhmanas there has been a difference of opinion as to what phenomenon these three steps originally represented. This description of Viṣṇu in the Rgveda Samhitā is undoubtedly the germ that ultimately

¹ महा० XII 348 describes Vāmana as the twelfth son of Kaśyapa and Aditi.

developed into the Epic and Purāṇic details of the Vamana incarnation

At many places¹ Viṣṇu is said to have helped Indra generally or by taking his strides. At some places² Indra's achievement of killing Vṛtra is attributed to Viṣṇu's aid. At some places³ Viṣṇu is said to have taken his three steps for the sake of Indra, following the laws of friendship. At some places⁴ Indra is said to have even solicited the help of Viṣṇu's strides for killing Vṛtra and at few places⁵ Viṣṇu is said to have taken his vast strides jointly with Indra. At some places⁶ gods are said to have triumphed in the three strides of wide-stepping Viṣṇu. Thus the idea of Viṣṇu giving relief to Indra and other gods by taking his three strides can be traced vividly in the Rgveda Samhitā. Viṣṇu's usual Vedic epithets Uṅgāya⁷ and Uṅkrama⁸ (= wide-stepping), the epithets बृहच्छरीर (of huge form), युवा (young), अकुमार (boy), etc., applied to him in I 155 6,⁹ his description

¹ *Bṛg*, अ० I 85 7 “विष्णुयद्वावद्वयम् मदच्युतं” etc.

² *Bṛg*, अ० VI 20 2 “अदि यद्वृत्रमपो वनिवासं हन्तृवीषिन्विष्णुना सचान ॥” etc.

³ *Bṛg*, अ० VIII 12 27 “यदा त (= त्वदर्थं, although Śhyanā explains it as तव अनुज्ञ) विष्णुरोजसा श्रीणि पदा विचक्रमे। आदिते हर्यता हरी ववन्तु ॥” VIII 52 3 (Vāṇakhyā 4 3) “यम् (= यदर्थम्) विष्णुवीणि पदा विचक्रमे। उप मित्रय धर्मभि ॥” etc.

⁴ *Bṛg*, अ० IV 18 11 “उत माता महिषमन्वजमदमा त्वा जहति पुत्र देवा। अयाश्वीद्वृत्रिमद्रो हनिष्यन्मखे विष्णो वितर विक्रमस्व ॥”, VIII 100 12 “सखे विष्णो वितर विक्रमस्व धौर्देहि लोक वज्राय विष्क्रमे। हनाव वृत्र रिण्वाव सिधुमित्रय यतु प्रसवे विमुष्टा ॥” etc. *Bṛhaddev* II VI 121 ff. says that Indra alone could not slay Vṛtra and so he solicited Viṣṇu's help.

⁵ *Bṛg*, अ० VI 69 5 “इन्द्राविष्णु तत्पनयाय वां सोमस्य मद उरु चक्रमाये ॥” etc.

⁶ *Bṛg*, अ० VIII 29 7 “त्रीशयेक उरुगाये विचक्रमे यत्र देवास्तो मदन्ति ॥” etc.

⁷ *Vide* अ० I 154 1, IV 3 7, VII 100 1, VIII 29 7, etc.

⁸ *Vide* अ० I 90 9, etc.

⁹ “वृत्रं सोऽं नवति च नामभिश्चक्र न वृत् व्यतरावीषिपत्। बृहच्छरीरो विमिमान अक्वभिर्युथाकुमारः प्रत्येत्याहवम् ॥”

in VII 99 1¹ as "increasing immensely with his huge body," etc., possibly give clues to many details of the Vāmana Incarnation. The statement in I 155 5² that only two steps of Viṣṇu are known to mortals and the third is not known to anybody might have given rise to the details of the incarnation in the Bhāgavata, etc.

The intermediate stage of the development of this germ is found in शतपथब्राह्मण 1 2 5,³ ऐतरेय ब्राह्मण 6 15,⁴ तैत्तिरीय-संहिता 2 13,⁵ तैत्तिरीयब्राह्मण 16 1,⁶ etc., where Viṣṇu assumes the form of a dwarf with a view to recovering the earth for gods from the Asuras by taking his three strides. Thus this avatāra can be traced back through

¹ "परो मात्रया तन्वा वृधान न ते महित्वमन्वशुवन्ति । उभे ते विष्णु रजसी पृथिव्या विष्णो देव परमस्य वित्से ॥"

² "द्वे इदस्य क्रमणौ स्वर्हणोऽभिरुपाय मर्त्यो भुरगयति । तृतीयमस्य नकिरा दणर्षति वयश्चन पतयन्त पतत्रिण ॥"

³ देवाश्च वा अक्षराश्च । उभये प्राजापत्या पृथिविरेततो देवा अनुव्यमिवासुस्थ हासुरा मेनिरेऽस्माकमेवेद खलु भुवनमिति ॥१॥ ते होचु । इन्तेमा पृथिवी विभजामहै तां विभज्योपजीवेमि ते तामोऽक्षीमभि पश्चात्प्राञ्चो विभजमाना अभीयु ॥२॥ तद्देवा शुशुवु । विभजन्ते ह वाऽहमाम सुरा पृथिवी प्रेत तदेव्यामो यत्रेमामसुरा विभजन्ते के तत स्याम यदस्यै न भजेमहीति ते यज्ञमेव विष्णु पुरम्कृत्येयु ॥३॥ ते होचु । अतु नोऽस्यां पृथिव्यामाभजतास्त्वेव नोऽप्यस्यां भाग इति ते हासुरा असूयन्त—होचुर्थावदेवैव विष्णुरभिषेते तावद्गो दश इति ॥४॥ वामनो ह विष्णुरास । तद्देवा न जिहीडिरे महद्गै नोऽदुयै नो यज्ञ-सेमितमवुरिति ॥५॥ ते प्राञ्च विष्णु न्प्राध etc (page 19)

Video also 1 9, 3 (page 98 ff)

⁴ उभौ (= इन्द्राविष्णु) हि तौ जियतु । न पराजयेये त पराजिय इति । न हि तयो कतरश्च न पराजिये । इन्द्रश्च विष्णो यदपस्पृधेयां त्रेधा सहस्र वि तदैर्येथामिति । इन्द्रश्च ह वै विष्णुश्चासुरैर्युधधाते तान्ह स्म जित्वोचतु कल्पामहा इति ते ह तथेत्यसुरा ऊचु सोऽक्षवीदिन्द्रो यावदेवाय विष्णुर्क्षिर्विक्रमते तावदस्माकमथ युष्माकमितरदिति स इमांल्लोकांस्विक्रमतेऽथो वेदानथो वाच तदाहु कि तत्सहस्त्रमितीमे लोका इमे वेदा अथो वागिती ब्रूयात् । etc (Anandāśrama edition, page 724 ff)

⁵ देवासुरा एव लोकेष्वपर्वन्त स एत विष्णुर्वा मनमपश्यत्स्वार्थै देवताया आलभत ततो वै स इमान् लोकानभ्यजयद्द्वैष्णव वामनमा लभेत स्वध'मानो विष्णुरेव भूत्वेमान् लोकानभि जयति विधम आ लभेत विषमा इव हीमे लोकास्समृद्ध्या इन्द्राय मन्थुमते मनस्वते ललाम प्राश्वद्मालभेत संप्रामे ॥१६॥ etc

⁶ विष्णुर्यज्ञ । देवतारचैव यज्ञ चावस्थे । वामनो वही दक्षिणा । यद्दही । तेनाग्नेय । यद्दामन । तेन वैष्णवस्समृद्धयै । अग्नीषोमीयमेकादशकपालं निर्वपति । अग्नीषोमाभ्यां वा इन्द्रो वृत्रमहन्निति । यदग्नीषोमीयमेकादशकपालं निर्वपति ॥६॥ etc,

an intermediary stage to the earliest period of the Indian literature. It is perhaps due to this fact that some Purāṇas ascribe¹ the details of this incarnation to the persons conversant in the Vedas while they ascribe,² the details of other incarnations (e.g., Rāma incarnation) to the persons conversant in the Purāṇas.³

VI PARASURAMA INCARNATION

(1) Sources

महाभारत II 49, III 98, 116-117, XII 46, 47-48, 348, XIV 30, etc., स्कन्दपुराण 47, etc., ब्रह्मपुराण 8, 71, 104, etc., विष्णुपुराण IV 7, 11, etc., I. 33, 41, 52, etc., हरिवंश भागवतपुराण I 3 20, II 7 22, IX 15-16, X 40 20, etc., etc.

¹ E.g., हरि० I 41, 103 (एष ते वामनो नाम प्रादुर्भागे महात्मन । वेद-विद्विर्द्विजैरेव कथ्यत वैष्णव यश ॥)

² E.g., हरि० I 41 149 (गाथा अप्यत्र गायन्ति ये पुराणविदो जना । रामे निबद्धतत्त्वार्था माहात्म्य तस्य धीमत ॥)

³ As a parallel instance of the Vāmana incarnation may be mentioned the Mārtāṇḍa incarnation of the sun described in ब्रह्म० 30. Aditi, pained at her son's humiliation at the hands of demons, propitiated the sun and moved him to become her own son and destroy the demons. The sun agreed and his ray called Susumna entered and dwelt in Aditi's womb. Aditi who was observing vows, was once during her pregnancy enraged by her husband Kāśyapa when she in fury produced a very brilliant egg (Gaubhāṇḍa) which ultimately developed into a son named Mārtāṇḍa. On Mārtāṇḍa's birth, Indra and other gods challenged their enemies and, under Mārtāṇḍa's leadership, completely vanquished them. Thus, under Mārtāṇḍa's guidance, the gods recovered their supremacy and portions in sacrifices. Mārtāṇḍa is further said to have produced two sons and a daughter.

The germ of this Mārtāṇḍa avatāra of the sun, too, can be traced to the Rgveda Samhitā. Vide X 72 8-9 —

अष्टौ पुत्रासो अकितेय जातास्तन्वस्वपरि ।
देवा उप प्रैत्ससभि परा मार्ताण्डमात्यत् ॥
ससभि पुत्रैरदितिरुप प्रैत्पृथ्व्यं युगम् ।
प्रजायै मृत्यवे त्वत्पुनर्मार्ताण्डमाभरत् ॥

(2) Brief Description

Viṣṇu became Paraśurāma, killed the entire race of Kṣattriyas twenty-one times and thereby relieved the earth of their burden and oppression

(3) Details

(a) Paraśurāma (so called because of his wielding an axe as his weapon also called Bhāṅgavaiṇama or Bhāṅgava (because he was a scion of the Bhṛgu race), was a son of Jamadagni and Reṇukā The details, however, as to the manner in which Viṣṇu took his birth in this incarnation,¹ usually mentioned in the case of other prominent avatāras, are not found² in the sources mentioned above This may

¹ Many passages mentioned above as also रामायण I 76 12—24, do not explicitly call Paraśurāma an avatāra, as shall be noted further

² Instead, however, details of the origin of Jamadagni, Paraśurāma's father, are found in most of the sources mentioned above Reṇika, Bhṛgu's son, married Satyavatī, Gadhī's daughter Sage Bhṛgu according to महा० III 116, ब्रह्म० 8, etc or sage Reṇika himself according to महा० XII 47 विष्णु० IV 7, भाग० IX 15, etc, gave one Caru (boiled rice) each to Satyavatī and her mother by eating which each would give birth to a son The mother and the daughter, however, exchanged their Carus and each ate up the portion allotted by the sage to the other The sage was extremely enraged to learn this affair and he cursed Satyavatī that, as the result of the exchange of the Carus, she would give birth to a Brāhmana son with the terrific qualities of a Kṣattriya and her mother to a Kṣattriya son with the pacific qualities of a Brāhmana Satyavatī repented and succeeded in moving the sage to grant that the terrific qualities of a Kṣattriya would go to her grandson and not to her son who would be endowed with the supreme qualities of a Brāhmana Then Satyavatī gave birth to Jamadagni, father of Paraśurāma, and her mother to Viśvāmitra It will be seen, after giving due consideration to the original curse and its modification by the sage, that Paraśurāma, and not Jamadagni, was the result of the Caru actually eaten by Satyavatī In ब्रह्म० 8, which does not explicitly mention Paraśurāma as an incarnation of Viṣṇu, the Caru eaten

perhaps be due to the fact that Paraśurāma was originally treated only as a historical figure and came to be designated as an avatāra of Viṣṇu only later on.

The main achievement of Paraśurāma is the killing of thousand-armed Kṛtāvīryājuna and other Kṣattriyas.¹ One day, in Paraśurāma's absence, Kṛtāvīrya came to Jamadagni's hermitage and forcibly took away the sage's cow to Māhismatī, his capital. Paraśurāma, learning of the event on his return, furiously chased the king and in the duel that ensued cut off with his axe Kṛtāvīrya's thousand arms and head² and brought back the cow to Jamadagni's hermitage. Later Kṛtāvīrya's sons came, again in Paraśurāma's absence, to the hermitage, killed Jamadagni and escaped³

by Satyawatī is designated as the Vaisṇava portion (Vaisṇavādharma), perhaps to implicitly identify Paraśurāma with Viṣṇu.

¹ Kṛtāvīrya was a supremely powerful king of the Haryā branch of the Yādava race. His power and majesty is said to be due to the favour of Duttakīreya whom he propitiated by his severe austerities for ten thousand years. His death at Paraśurāma's hands is also said to be due to a boon granted by Duttakīreya, viz. that his death would occur at the hands of a supreme person with world-wide reputation. *Vids. dṛṣṭi* I 33 (where it is also said to be further due to a curse of Vasistha, viz. that a Brāhmana would kill Kṛtāvīrya in battle). *विष्णु* IV 11, etc.; Kṛtāvīrya is generally said to be, despite his unique prowess, a pious king strictly abiding by the ways of Dharma and refraining from the counsels of Adharma. Yet in भाग. I 320 ff 7-22, 1X 15, etc., he as well as the entire kings and Kṣattriyas killed by Paraśurāma are described as most wicked, possessed of by the qualities of Rajas and Tamas, a menace to the earth destined by the Ordainer for destruction and hell due to their notorious hostility with the Brāhmanas which is very much emphasised here.

² भाग. IX 15 says that Jamadagni disapproved his son's deed of killing the king and asked him to wipe off that stain by constantly visiting holy places.

³ भाग. IX 16 says that they took away Jamadagni's head. Later Paraśurāma recovered it and applied it to Jamadagni's trunk, whereupon Jamadagni became the seventh sage in the circle of Rsis.

to the capital. Then Parasurāma invaded Māhsmati and killed Kārtavīrya's sons along with all their environments. As his spirit of revenge was not quenched by this much, he destroyed the entire Ksattīya race twenty-one times, making the earth Ksattīyaless. Several pools are said to have been filled up by the blood of the Ksattīyas killed by Parasurāma.

Parasurāma then held a sacrifice¹ with a view² to wiping away his stain arising from his massacre of the Ksattīya race. In the sacrifice he ultimately gave off the earth of which he had come to be the master, as Dakṣinā³ to sage Kaśyapa and then himself⁴ went off to the mountain called Mahendira where, it is said,⁵ he is still⁶ practising penances.

¹ The sacrifice is generally designated as Aśvamedha (*vide* हरि० I 41, ब्राह्म० 104, etc.)

² भाग० IX 16 says that Parasurāma held the sacrifice in honour of Supreme Self. It seems to locate it to the bank of the Sarasvatī where Parasurāma is said to have performed the final Avabhitha bath ceremony.

³ The Dakṣinā contained many other gifts besides the earth. Many other priests besides Kaśyapa are said to have received those other gifts. भाग० IX 18 21 ff thus describes Parasurāma's allotment of gifts—ददौ प्राचीं दिशं होत्रे ब्रह्मणे दक्षिणां दिशम् । अश्वयवे प्रतीचीं वै उद्गात्रे चोत्तरां दिशम् ॥ अन्येभ्योऽर्वांतरदिशं कश्यपाय च मध्यत । आर्यावर्तमुपद्रष्टे सदस्येभ्यस्ततः परम् ॥ etc. हरि० I 32, etc., say that Kaśyapa further surrendered the earth to Manu. महा० XII 48, etc., say that during Kaśyapa's possession of the earth numerous calamities occurred and the earth began to sink down to the Rasātala due to kinglessness. Then Kaśyapa supported the earth on his thigh (Ūru, whence the earth derived the name Ūrvi) and, at her request, coronated as kings several princes born of Hathaya queens, widows of Parasurāma's victims.

⁴ महा० XII 48 says that Kaśyapa, on getting the earth bade Parasurāma leave the earth and repair to the other end of the ocean.

⁵ The belief is that Parasurāma is an immortal person.

महा० II 92 gives the names of Kāitaviya, Jambha, Śatadundubhi, etc., as prominent among the Kṣātriyas killed by Parasurāma. It further says that Parasurāma fought with King Saubha Śilva for one hundred years. Certain small girls (Nagnikā Kumārīs) asked Parasurāma to throw off his weapon as Saubha was destined to be killed later on jointly by Kṛṣṇa, Pradyumna and Sāmba. Parasurāma then abdicated every weapon and missile and went off to practise austerities.

(b) महा० III 117, भाग० IX 16, etc., give the myth of Parasurāma killing his mother Renukā. Parasurāma and his brothers were asked by Jamadagni to slay Renukā for her mental violation of chastity. Parasurāma's brothers did not agree and fell down dead due to Jamadagni's curse. Parasurāma, however, agreed and instantly killed Renukā. Pleased at his obedience, Jamadagni granted him boons by which, as Parasurāma selected, Renukā and her dead sons regained their lives without retaining the memory of the event.

(c) महा० III 98, etc., give the well-known story of Parasurāma's humiliation at Rāma's hands. Rāma, who had broken Parasurāma's bow at the Svayamvara of Sītā, was, later at a meeting, challenged by Parasurāma to besting his new bow and to shoot a particular arrow therefrom. Rāma rebuked Parasurāma for his vanity, exhibited his own supreme form to him and shot the particular arrow which excessively tormented Parasurāma and took away his entire strength and lustre. Parasurāma, on regaining consciousness, went to the Mahendira mountain where his ancestors consoled him and advised him to practise penances at holy places. Parasurāma did accordingly and regained his strength and lustre.¹

¹ In this description Rāma is throughout distinctly identified with Supreme Divinity whereas Parasurāma's identity with Supreme Divinity is not even implicitly suggested. [Vide also रामायण I 76 12-24]

(d) Many other allusions to Paraśurāma are made in the Epics and the Purāṇas, in many cases without identifying him with Viṣṇu. He is said to have taught the science of warfare to Bhīṣma, Drona, Kṛpa, Kṛṇi and others. He is said to have taken Ambālikā's cause and unsuccessfully tried to force Bhīṣma to marry her. He is said to have come to the Kauravas' court to witness Kṛṣṇa's peace-efforts and to have himself tried to move Duryodhana to accede to the Pāṇdavas' demands. In हरि० II and other Purāṇas he is said to have met Kṛṣṇa and Balatāma a number of times (e.g., when the two brothers were confronted with Jarāsandha, Śṛṅgāṇa, etc.) and to have suggested to them means of getting through some difficulties. Many other minor details about him are mentioned in the Epics and the Purāṇas.

(4) Remarks

Usually this is said to be Viṣṇu's sixth avatāra and comes after the Vāmana and before the Rāma incarnation. This avatāra stands sixth also in मत्स्य० 47-244¹ where, however, Māṇdhātā Cakravartī is said to be Viṣṇu's fifth incarnation. In भाग० I 3 and II 7 this ranks respectively as the sixteenth and the seventeenth among Viṣṇu's twenty-two avatāras. In महा० III 98, 116-17, XII 47-48, XIV 30, etc., अष्टा० 8,² etc., Paraśurāma is not explicitly, and in some cases not even implicitly, treated as an avatāra of Viṣṇu.

In this incarnation Viṣṇu appears as a fully developed man. The achievements generally attributed to this incarnation are of an extraordinary type and not superhuman. Paraśurāma, in fact, appears, like Rāma and Kṛṣṇa, to be a

¹ Other facts mentioned here are that this avatāra occurred in the nineteenth Tretā and that Viśvāmitra was Viṣṇu's priest in this incarnation.

Here Paraśurāma's identity with Viṣṇu may be said to be implicitly suggested by the designation "Vaiṣṇavārḍhamśa" of Sātyavati's Caru, as already noted above.

historical figure with a net of exaggerated accounts woven around him. Rescue of the Brāhmanas and destruction of the impudent seem to be the main objects of this incarnation.

(5) Origin

Possibly the details of this avatāra cannot be distinctly traced in the pre-Epic literature. One Rāma, son of Jamar-dāgni, is mentioned in Kātyāyana's *Saivīnukramanikū* as an alternative seer of some Rgvedic Sūktas.¹ It may be that this Jāmadagnya Rāma is originally the same as the Purānic Para-surāma. But then it is difficult to guess as to how the extraordinary feats of a unique warrior came lately to be attributed to a Vedic Seer and as to how the Vedic Seer² came lately to be treated as an incarnation of Viṣṇu. The only similarity between the two is that both are Brāhmanas.

The use of Paraśu (axe or thunderbolt) as a weapon is mentioned in the Rgveda Samhitā³ and Parasurāma's wielding of that weapon may be traced to those passages.

VII RAMA AND VIII KRISHNA OR BALARAMA OR BALARAMA-KRISHNA INCARNATIONS

These are the most popular of Viṣṇu's incarnations and have been narrated at length, in numerous versions, in almost all the Purānas besides the Epics. In most versions⁴

¹ *Eg*, X 110 " जमदग्निस्तत्सुतो वा राम."

² Kṛṣṇa Devakīputra, mentioned in the *Chāndogya Upaniṣad* 3 17 6 as a disciple of sage Ghora Āmigrasa (possibly identical with sage Kṛṣṇa Āmigrasa, the seer of Rgveda Sūktas X 42—44), whom R. G. Bhandarkar holds to be identical with Lord Kṛṣṇa-Vāsudeva of post-Vedic literature, might be mentioned as a parallel instance. But then it is to be noted that the identity upheld by Bhandarkar rests on uncertain grounds and is still open to grave doubts.

³ *Eg*, X 28 8 (देवास आयन्परशुर्विभ्रन्वन्ना दृशन्तोऽभिविद्भिरायन्, etc.), X 53 9 (where it is mentioned as Brhaspati's weapon), etc.

⁴ *Eg*, महा० XII 348 55, etc.

Kṛṣṇa alone is recognised as an avatāra, while in a few versions¹ Balarāma alone is treated as such, although the achievements attributed to Balarāma at those places can more properly be attributed to Kṛṣṇa himself. In some places² both Balarāma and Kṛṣṇa are treated as two distinct avatāras, while in some places³ they are treated jointly as one avatāra. Vivid descriptions are given in the case of these avatāras as to how Viṣṇu was approached for help, how he agreed to go on the earth, how he, in person, descended to the earth and took his birth from human parents, how he grew as a child, a boy and a man, how he made various achievements, how ultimately he was requested by the gods, etc., to return to the heaven, how he, under the pretext of death, abandoned his human body, took his soul to his abode and united it with his original Supreme Self, etc., etc. Although numerous superhuman activities are attributed to these incarnations, yet, taken as a whole, Rāma, Balarāma and Kṛṣṇa appear as human beings of an extraordinary type. For several reasons the treatment of these avatāras has been left out from the present work.

IX BUDDHA INCARNATION

(1) Sources

महाभारत Interpolations in XII 46, 348, etc., मत्स्यपुराण 47, भागवतपुराण I 3 24, II 7 37, X 40 22, etc., etc

(2) Brief Description

With a view to saving the Vedas and the Vedic rites from abuse at the hands of unauthorised demons, Viṣṇu became Buddha, depreciated the Vedas and the Vedic rites, preached compassion towards animals slaughtered in

¹ Eg., महा० XII 348 2 ff., etc. In most versions, Balarāma appears as an avatara of the serpent Śeṣa who is also described as a form of Viṣṇu.

² Eg., vl of महा० XII 344 2, भाग० I 3 23, etc.

³ Eg., भाग० II 7 26—35, etc.

sacrifices and thereby deluded unauthorised demons from making use of the Vedas and the Vedic rites

(3) Details

Very few other details are found about this avatāra. In the Mahābhārata slight allusions to this avatāra occur in passages which are given as readings of few manuscripts and seem to be later interpolations. They say that Buddha, Viṣṇu's incarnation, was a son of Śuddhodana, that he deluded the Dānavas, caused them to desist from studying the Vedas and from holding sacrifices and thus saved the Vedas and sacrifices from abuse at the Dānavas' hands¹ मत्स्य० ४७ २४७ in its cursory allusion to this incarnation² adds the facts that Buddha was endowed with celestial beauty and that his priest was Dvaipāyana भाग० १ ३ २४³

¹ Explicit mention of Buddha is not found in the genuine readings of the Mahābhārata manuscripts. Even in महा० XII ३४८ where, along with the interpolated details of the Buddha incarnation is given the verse “मत्स्य कूर्मो वराहश्च नरसिंहोऽथ वामन । रामो रामश्च रामश्च बुद्ध कल्कीति ते दश ॥” we find in some manuscripts the variant reading “कृष्ण कल्कीति ते दश” for “बुद्ध कल्कीति ते दश”. Further, in the same chapter (महा० XII ३४८ ५०) Viṣṇu's ten incarnations are again enumerated where the Buddha incarnations is replaced by the Hamsa incarnation—“हंस कूर्मश्च मत्स्यश्च प्राग्भावा द्विजोत्तम । वराहो नरसिंहश्च वामनो राम एव च । रामो दाशरथिश्चैव सात्वत कल्किश्चैव च ॥” Thus it may be safely concluded that the Buddha incarnation was not originally present in the Mahābhārata.

² “कर्तुं धर्मव्यवस्थानमसुराणां प्रणाशनम् । बुद्धो नवमको जज्ञे तपसा पुष्करे क्षणे । देवसुन्दररूपेण द्वैपायनपुर मर ॥” The facts that the purpose of this avatāra was the establishment of Dharma and the destruction of the Asuras and that Buddha had become lotus-eyed due to his penances are also mentioned here and may be taken to allude to Buddha's starting a new religion and to the penances he practised before he saw the Supreme light.

³ “ततः कर्तौ संप्रवृत्ते संमोहाय क्षरद्विषाम् । बुद्धो नास्त्रा जितसुन कीकटेषु भविष्यति” ॥ It will appear that the description is here given as a forecast.

and II 7, 37¹ add that the Buddha incarnation took place at the beginning of the Kalyuga, that Buddha, son of Jina, was born in Magadha (the country of the Kikatas), that he, putting on an enchanting form, propounded a new creed, thereby deluding the demons (enemies of gods) who had been highly devoted to the Vedas and the Vedic rites and used to kill people from the invisible and busk-moving citadels built by Maya. The Bhāgavata in its subsequent chapters details almost all the major incarnations of Viṣṇu but, notably enough, does not make any detailed allusion to the Buddha incarnation.²

(4) Remarks

Although, as noted above, this incarnation is not included in the earlier lists of Viṣṇu's incarnations, yet it has made its position firm in the current³ popular list of Viṣṇu's ten incarnations. Generally this is said to be the ninth avatāra and comes after the Kṛṣṇa and before the Kalki incarnation. It stands ninth also in मत्स्य० 47 237—249 where, however, the Vyāsa, and not the Kṛṣṇa, stands eighth. It stands twenty-first in the lists of Viṣṇu's twenty-two incarnations given in भाग० I 3 and II 7.

It goes without saying that the person referred to in the descriptions of this avatāra is none but Gautama Buddha himself. How strange it is that Buddha, who started an anti-Vedic and anti-Brahmanical religion and proved the most formidable foe to the ancient orthodox religion of India, came, many centuries after his death, to be called an

¹ "देवद्विर्वा निगमवर्त्मनि निष्ठितानां पूर्वममेवेन विहिताभिरदृश्यत्पूर्वि । लोकान्मृता मतिविमोहमतिप्रलोभं वेद्य विधाय बहुभाष्यत औपधर्म्यम् ॥" Here, too, the description appears as a forecast by Brahman who is represented as relating Viṣṇu's twenty-two incarnations to Nārāda.

² A very brief allusion occurs in भाग० X 40 22 (नमो बुद्धाय शुद्धाय दैत्यदानवमोहिने) where Buddha is described as Śuddha, i.e., pure.

³ Vide Jayadeva's Gītāgovinda (निन्दसि यज्ञविधेरहं श्रुति-जातम् । सद्यस्त्वद्वदंशितपशुजातम् । केशव धृतबुद्धशरीरं जय जगदीश हरे ॥), etc.

incarnation of Viṣṇu, the supreme god of the current orthodox religion of the Hindus¹ Indeed, it illustrates¹ the tendency of the Indians of the pre-Muhammadan period to incorporate all things, even those most radically opposed to their original principles, in their own religion after colouring them in their own way and to trace the greatness even of their adversaries to the Supreme God of their own creed as its source

As to how hostile was the attitude of the earlier orthodox Hindus towards Buddha and his anti-Vedic religion need not be detailed here The famous line of the Rāmāyana “यथा हि चोर स तथा हि बुद्ध” where Buddha is compared to a thief represents that attitude² Prominent missionaries of Advaita Vedānta, Pūrva-mīmāṃsā and other orthodox Hindu schools, like Śaṅkara, Kumāṇila, Mandana, etc., made Buddhism, by their repeated desperate attacks, insignificant and practically non-existent in India It may be that after this age (c 800 A C) the Hindus changed their hostile attitude towards Buddha and Buddhism, perhaps owing to the subsequent non-resistance of the Buddhist missionaries, and, incurring admiration for Buddha's greatness, finally identified him with their own Supreme God, interpreting his work, of course, in orthodox Hindu colours Or it may be that orthodox Hindu mythologists (viz., the authors of the Purāṇas) had begun to preach admiration for Buddha, giving orthodox Hindu colours to his work, from somewhat an earlier period, despite the continued hostility of the Advaita Vedāntins, the Mīmāṃsakas, etc., towards Buddha and

¹ *Vide* also मत्स्य० 24-44 ff where Brhaspati is said to have founded the religion of the Jinās (i.e., the Jainism) with a view to deluding the sons of Rājā with a view to Indra's benefit This description possibly implies that Mahāvīra Jina, the founder of Jainism, was an incarnation of Brhaspati, the preceptor of all gods

² That the genuine Manuscripts of the Mahābhārata are silent about Buddha has been stated above

Buddhism and had begun to identify him with their God of gods as early as the reign of Haishavardhana of Thaneshvar and Kanauj

X KALKI¹ INCARNATION

(1) Sources

महाभारत II 50, III 93-194, XII 46, 348, etc , हरिवंश I 41, etc , मत्स्यपुराण 47, etc , ब्रह्मपुराण 104, etc , भागवतपुराण I 3 25, II 7 38, X 40 22, etc , etc

(2) Brief Description

At the end of the Kaliyuga, Visnu shall be born as Kalki, shall destroy Mlecchas, etc , and put an end to heterodoxy and shall re-establish Dharma and orthodoxy

(3) Details

This, unlike other incarnations which are past, is a forecasted incarnation All versions say that it will occur at the end of the Kali Age when heterodoxy shall have reached its climax² and Brāhmanism shall be looked down upon everywhere महा० III 193, हरि० I 41, ब्रह्म० 104, etc , say that a village called Sambhala or Śambhala shall be Kalki's birth-place हरि० I 41 further says that the stronghold of Kalki and his followers shall be in the region lying between the rivers Gangā and Yamunā This statement perhaps implicitly locates the Sambhala village in that region

महा० II 50, III 193, हरि० I 41, ब्रह्म० 104, etc , mention the name Visnuyāśas as an *alias* of Kalki महा० XII 348, मत्स्य० 47 248-249, भाग० I 3 25, etc , however, give that

¹ The base of the word appears both as Kalki and Kalkin at different places

² *Vide* महा० III 193, हरि० I 41, भाग० II 7 38 etc , for details of the forecasted dark events of the Kali Age necessitating this *avatāra* The time when the Kali Age will terminate and the Kṛta Age commence is thus described astronomically in महा० III 193 91—“यदा सूर्यश्च चन्द्रश्च तथा तिष्यवृहस्पती । एकराशौ समेप्यन्ति प्रपत्स्यति तदा कृतम् ॥”

name as of Kalki's father हरि० I 41, etc, say that Yājñavalkya shall be Viṣṇu's priest in the Kalki incarnation, whereas in मत्स्य० 47 248 49 both Yājñavalkya and Pārāśarya are mentioned as the forecasted priests of Viṣṇu in this incarnation. Most versions mention Kalki definitely as a Brāhmana, a few (e g, हरि० I 41, etc), however, describe him simply as a Dvija.

महा० III 193-94 further says that Kalki, a Brāhmana of great talent, power and valour, shall be surrounded by Brāhmanas. All conveyances, weapons, missiles, armours and warriors shall, at his mind's call, come to attend upon him. Then he shall attain righteous victories and shall become the supreme monarch (Cakravartī Rājā) of the age. Then he shall put an end to the decay and the chaos prevailing among the people and shall establish order and happiness. Aided by the Brāhmanas, he shall destroy the entire Mlecchas, thieves, etc. Then he shall perform the supreme horse sacrifice wherein he shall, with due rites, give away the earth, with order and original caste-limits re-established, to the Brāhmanas. Finally, having introduced in the countries subdued the sacred Kṛsnājinas, Śaktis, Trisūlas and Āyudhas, he shall roam on the earth, duly adoring the Brāhmanas and ever bent on killing thieves (Dasyus), etc.

महा० XII 348, etc, add that Kalki, a Brāhmana of green-brownish complexion (Haripingala), shall possess a horse and other Brāhmanas, who shall help him in destroying the Mlecchas and other heterodox people, shall also possess horses.

हरि० I 41 165, मत्स्य० 47 249, etc, describe the Kalki incarnation as भाव्यसंभूत or भाव्यसंपन्न, Nilakantha, the commentator of the Harivamśa, explains भाव्यसंपन्न as भाव्यै चक्षिकवादिभिः सह संपन्न वादे युद्धे च संगत. According to this explanation, the heterodox people whom Kalki is forecasted to vanquish are none but the Buddhists themselves.

(4) Remarks

In almost all the lists this is given as Visnu's last incarnation, either as the tenth or as the twenty-second

Kalki's partiality for the Brāhmanas is exceptionally emphasised in most versions, although अष्टा० 104,¹ etc., assert that the purpose of this incarnation was general welfare

Hitherto the popular list of Visnu's ten avatāras has been dealt with. Henceforth shall be treated the variants² of some of Visnu's ten avatāras and further his avatāras of other lists³ not included in any enumeration of his ten avatāras

XI NARAYANA OR NARA-NARAYANA INCARNATION**(1) Sources**

महाभारत XII 342, etc., मत्स्यपुराण 47 237-38, भागवतपुराण I 3 9, II 7 6-8, etc

(2) Description

Very few details are mentioned about this incarnation⁴. The few details found are that Nara and Nārāyaṇa, a joint incarnation of Visnu, were born as sons of Dharmā and Dakṣa's daughter, that they practised severe austerities at Badarī, that they possessed such a unique self control that amorous movements of celestials, damsels, Cupid's forces, could not affect them in the least and that they, pleased at prince Dhruva's penances, granted him stability (Dhruvagaṭi) in the heaven मत्स्य० 47 237-38

¹ 'कल्की विष्णुयशा नाम शम्भलग्रामसंभव । सर्वलोकहितार्थाय सृज्यो देवो महायशा ॥'

² Viṣṇu, Nārāyaṇa or Nara-Nārāyaṇa, Vyāsa, Dattātreyā, Māndhātā Cakravartī, Hamsa and Pauṣkaraka

³ Bṛg., भाग० I 3, II 7, कूर्म० 51, etc

⁴ Nārāyaṇa or Nara and Nārāyaṇa are mentioned in so many places, but generally they are stated to be merely another form, and not an incarnation, of Visnu

says that the Nārāyaṇa incarnation occurred in the Cākṣusa Age and that Brahmin was Viṣṇu's priest in this incarnation¹

(3) Remarks

In मत्स्य० 47, this, viz., the Nārāyaṇa, stands first among Viṣṇu's ten incarnations, as also among his three divine (Divya) incarnations. Nowhere else this incarnation seems to have been included among Viṣṇu's ten avatāras. In भाग० I 3 and II 7 this joint avatāra ranks respectively fourth and sixth among Viṣṇu's twenty-two avatāras.

XII VYĀSA INCARNATION

(1) Sources

महाभारत XII 359, etc., हरिवंश I 41, etc., मत्स्यपुराण 47, etc., कूर्मपुराण 14, 51, etc., भागवतपुराण I 3 21, II 7 36, etc., etc.

(2) Brief Description

Viṣṇu became Vyāsa and divided the Vedas into several branches for the benefit of people.

(3) Details

In महा० XII 359, Viṣṇu is said to have forecasted during the seventh creation that in the next Age (Manvantara) he would become Kṛṣṇadvāipāyana Vyāsa and would divide the Vedas.

Vyāsa is described as the son of Parāśara and Satyawatī हरि० I 41 and भाग० II 7 mention only his mother, मत्स्य० 47 mentions only his father, भाग० I 3 mentions both हरि० I 41, मत्स्य० 47, etc., say that this incarnation took place in the 28th Dvāpara and that Jātukarṇya was Viṣṇu's priest in this incarnation.

¹ Even in महा० XII 342, where Nara and Nārāyaṇa, two of Viṣṇu's four forms, are said to have been born as Dharma's son, they are not designated as incarnations (Avatāra, Prādurbhāva, etc.) as such.

The achievement of dividing or expanding the Veda or the Vedas is generally attributed to Vyāsa who thence derives his epithet *Vedavyāsa*¹ (expander of the Veda) हरि० I 41, etc., say that Vyāsa expanded one Veda into four भाग० I 3 21, II 7 36, etc., say that Vyāsa divided the Veda-tree into several branches when he observed it to have gone beyond the grasp of people whose intellect and longevity had now considerably decayed हरि० I 41 further attributes to him the achievement of generating the line of the Bharatas

In कूर्म० 14, Sūta, the narrator of the Purāṇa, who identifies himself with Viṣṇu born as Sūta during Prthu's sacrifice, says that Kṛṣṇadvāpīyana Vyāsa² imparted to him the knowledge of the Purāṇas in Prthu's age कूर्म० 51³ says that Kṛṣṇadvāpīyana Vyāsa was a complete incarnation of Viṣṇu assumed out of his own free will and that he alone possessed the knowledge of eternal Supreme Brahman⁴ which even gods and sages did not possess⁵

¹ Eg, हरि० I 41 161, मत्स्य० 47 246, etc

² Vyāsa also is identified with Viṣṇu in this passage (अग्निमन्मन्वन्तरे व्यास कृष्णद्वैपायन स्वयम्। श्रावयामास मां प्रीत्या पुराणं पुष्पा हरि ॥ etc)

³ कृष्णद्वैपायनो व्यासो विष्णुर्नारायण स्वयम्। अवातरत्स तं पूर्णं स्वेच्छया भगवान्हरि ॥ अनाद्यन्त पर ब्रह्म न देवा मृषयो विदुः। एकोऽयं वेद भगवान् व्यासो नारायण प्रभु ॥

⁴ This statement possibly implicitly ascribes the Vedānta Brahma-Sūtras to Kṛṣṇadvāpīyana Vyāsa

⁵ Further, in कूर्म० 52, twenty-five incarnations of Vyāsa himself are mentioned possibly with the presumption that Vyāsa himself, like Viṣṇu, was an eternal spirit. The incarnations, which are all said to have occurred in various Dvāparayugas, are in order — (1) Svāyambhuva Manu (who, under Brahman's command, divided the Veda into several parts), (2) Prajāpati, (3) Uśanas, (4) Brhaspati, (5) Savitr, (6) Mṛtyu, (7) Indra, (8) Vasiṣṭha, (9) Śarasvata, (10) Tridhīman, (11) Rṣabha (12) Sutejas, (13) Dharma, (14) Sucakṣus, (15) Trayyārūṇi, (16) Dhanañjaya, (17) Kṛtāñjaya, (18) Rtañjaya, (19) Bharadvāja, (20) Gautama, (21) Vācaśravas (22) Nārāyana, (23) Trnaḥbindu, (24) Vālmiki, and (25) Kṛṣṇadvāpīyana Vyāsa

(4) Remarks

In हरि० I 41 and मत्स्य० 47, the Vyāsa incarnation ranks respectively as the ninth and the eighth among Visnu's ten incarnations. In भाग० I 3 and II 7 it stands respectively as the seventeenth and the twentieth among Visnu's twenty-two incarnations. In most other lists Vyāsa is not recognised as a major avatāra of Visnu.

From the above-mentioned details it is clear that the person referred to by this avatāra is the famous Vyāsa who is said to be the author of the Mahābhārata and the Purāṇas and is also, perhaps wrongly, identified with the author of the Bṛahma-Sūtrās, who, at his mother's request, is said to have generated two sons in the widows of Prince Vicitravīrya with a view to the continuance of the race of the Bharatas and who is said to have rendered great help both to the Kauravas and to the Pandavas by means of his counsels, spiritual guidance, etc. However, his numerous activities are mentioned in the Mahābhārata without, in most cases, identifying him with Visnu.¹

XIII DATTATREYA INCARNATION

(1) Sources

महाभारत II 48, XIII 2०7, etc., हरिवंश I 33-41, etc., मत्स्यपुराण 47, etc., ब्रह्मपुराण 71, 104, etc., विष्णुपुराण IV 11, etc., भागवतपुराण I 3-4, II 7-4, IX 15, etc., etc.

(2) Details

The above sources give only a few details about this incarnation. Dattatṛeya is usually described as a Brāhmana

(born in the 25th Dvāpara as Parāśara's son). This twenty-fifth Kṛṣṇadvaipāyana Vyāsa is said to have divided and expanded the Veda and to have taught and appointed to various functions his five disciples viz., Jaimini, Sumantu, Vaiśampāyana, Paṇḍita and Sūta.

¹ In being regarded as an incarnation of Viṣṇu, Vyāsa, son of a fisherman's daughter (Matsyagandhā, who later on came to

sage, son of Atar and Anasūya भाग० I 3 11 says that Visnu became Atar's son because of a boon won by Anasūya भाग० II 7 4 says that Visnu said "I have given myself to you (दत्तो मयाहम्)" to Atar who longed for progeny and thus he in this incarnation came to be designated as Dattā (हरि० I 41, ब्रह्म० 104, etc., which describe Dattātreya as endowed with the supreme quality of forgiveness (चमया परया युत), say that this incarnation occurred at a time when the Vedas, the Prakṛiās, Vedic rites and the sacrifices had perished, the institution of four castes had been infested with chaos, Dharma had slackened, Adharma had increased, truth had perished, falsehood had survived and people were fastly decaying and that Dattātreya set right all these matters¹ हरि० I 41 further describes this incarnation as novel (अभूतात्मकः), glorious (श्रीमान्), wonderful (अद्भुत) and auspicious (शुभ)

The prominent event of this incarnation is Dattātreya's granting boons to Kārtavīryārjuna, the powerful Haihaya king. Pleased at his penances,² Dattātreya granted Kārtavīrya several boons by which he became lord of the entire earth, thousand-armed, supremely powerful and invincible in battles, yet righteous and conversant in the matters of Dharma.³ भाग० II 7 4 says that the Yadus, the

be called Satyavati) and, in a way saviour of the Vedas and of the Kuru race, seems to bear some faint similarity with the Fish incarnation which saved Manu, etc. and the Vedas from destruction.

¹ He revived the Vedas, the rites and the sacrifices and dispelled chaos from the institution of four castes. *Vide* "दत्तात्रेय इति ह्यात क्षमया परया युत ॥ तेन नष्टेषु वेदेषु प्रक्रियास्त मलेषु च । चातुर्वर्ग्यं च संकीर्णं धर्मे शिथिलतां गते ॥ अभिवर्धति चाधर्मे सत्ये नष्टेऽमृते स्थिते । प्रजास्त शीर्यमाणान् धर्मे चाकुलतां गते । सद्यज्ञा सक्रिया वेदा प्रत्यानीता हि तेन वै । चातुर्वर्ग्यमसंकीर्णं कृत तेन महात्मना ॥ etc."

² हरि० I 33, etc., say that Kārtavīrya practised severe austerities for propitiating Dattātreya for ten thousand years.

³ हरि० I 33, विष्णु० IV 11, etc., also add that one of the boons granted Kārtavīrya that his death would occur at the hands of a supreme warrior (like Paraśurāma) renowned in the whole world.

Pathiyas, etc., prospered immensely due to their ardent devotion to Dattātrēya.

ब्रह्म० 71 says that Dattātrēya taught Yoga in all its eight aspects to Alarka भाग० I 3 11 says that he imparted the knowledge of Ānyāśikī (Logic) to Alarka, Prahrāda and others.

मत्स्य० 47 242 says that this incarnation occurred in the first Tretā when even the fourth part of Dhruva had perished and that Mārīkandeya was Viṣṇu's priest in this incarnation.

(3) Remarks

This avatāra, when mentioned, generally comes between the Vāmana and the Parāśurāma incarnations. In ब्रह्म० 71, however, it comes after the Parāśurāma incarnation and in मत्स्य० 47 it stands between the Vīmaṇa and the Māndhātā Cakravartī incarnations. In मत्स्य० 47 it ranks fourth among Viṣṇu's total ten incarnations and first among his seven human (Mānusa) incarnations which are said to have occurred due to Bhṛgu's curse. In भाग० I 3 and II 7 it ranks respectively as sixth and fourth among Viṣṇu's twenty-two incarnations.

XIV MANDHATA CAKRAVARTI INCARNATION

Notably it is only मत्स्य० 47 that mentions this incarnation. It says¹ that this fifth incarnation of Viṣṇu occurred in the fifteenth Tretā and that Uttamka was Viṣṇu's priest in this incarnation. No further details are found. This incarnation is not recognised as such even in the lists of Viṣṇu's twenty-two avatāras given in भाग० I 3 and II 7. Details of king Māndhātā, a devotee of Viṣṇu, are given in भाग० IX 6 ff., etc., where too there is no indication of Māndhātā being an avatāra of Viṣṇu or of any other deity.

¹ "पञ्चमं पञ्चदश्यां च त्रेतायां लब्धभूव ह । मान्धाता चक्रवर्ती तु तदोत्तङ्गपुर-
सर ॥" मत्स्य० 47 243. The avatāra ranks here as Viṣṇu's second Mānusa avatāra.

XV HANSA INCARNATION

This avatāra has been included in the list of Viṣṇu's ten incarnations given in महा० XII 348-55¹ where it replaces the Buddha incarnation of the popular list.

This avatāra finds no place in the first list of Viṣṇu's twenty-two avatāra given in भाग० I 3 but seems to be indistinctly mentioned as Viṣṇu's fifteenth avatāra in the second list given in भाग० II 7 where Viṣṇu, in the form of Hansa as explained by commentators, is said to have affectionately imparted to Nārada the knowledge of Yoga and Bhāgavata philosophy.²

XVI PAUSKARAKA INCARNATION

The description³ of this incarnation given in हरि० I 41 26-27, ब्रह्म० 104 30-31, etc., is very obscure and it is not clear as to how to compare this so-called avatāra with other avatāras of Viṣṇu. The description says that the Pauskaraka incarnation, eulogised in the Vedas and in the Purāṇas, occurred when Viṣṇu was sleeping on the waters of the ocean and gods, ṛsis, etc., congregated (or were born) in the well-known Puskara (a lake or a lotus). Nothing can be said in connection with this so-called avatāra, which in both passages stands first among Viṣṇu's avatāras, due to the obscurity of the descriptions. No avatāra designated as Pauskaraka⁴ finds place among Viṣṇu's twenty-two avatāras, mentioned in भाग० I 3 and II 7.

¹ Vide above footnote 218.

² "तुभ्य च नारद भूष भगवान्विबुद्धभावेन साधु परिलिष्ट उवाच योगम् । ज्ञानं च भागवतमात्मसत्त्वदीपं यद्वासुदेवशरणा विदुरञ्जसैव ॥" (भाग० II 7 19)

³ "पुरा कमलनाभस्य स्वपत सागराम्भसि । पुष्करे तत्र संभूता देवा सर्वाङ्गान्मन्त्रा ॥ एष पौष्करको नाम प्रादुर्भावो महात्मन । पुराणे कथ्यते यत्र वेदश्रुतिसमाहित ॥"

⁴ In महा० II 45 the Boar incarnation is described as पौष्करिक वाराह प्रादुर्भाव । In हरि० I 41 and ब्रह्म० 104 the description of the Pauskaraka avatāra is immediately followed by the description of the Varāha incarnation, but the two descriptions seem to allude to two

Many of the twenty-two avatāras of Viṣṇu mentioned in भाग० I 3 and II 7 have been dealt with in the foregoing treatment. Of the remaining avatāras Nārada and Mohinī are mentioned only in भाग० I 3, Nityasūtras and Gajendramokṣakāṇḍa only in भाग० II 7, and Sanatkumāra (or Catuṣṣana), Kapila, Yaśūṁ (or Śuṣyāṁ), Rṣabha, Pithu and Dhīvantarī in both.

XVII NARADA INCARNATION

In भाग० I 3 8, Nārada, third incarnation of Viṣṇu, is described as a sage¹ who ultimately became a Devaṁsi (divine sage) and propounded the Sāttvata Tantra leading to the destruction of Kāma. Numerous allusions to sage Nārada and his activities are made in the Epics and the Purāṇas without, however, identifying him with Viṣṇu.

XVIII MOHINI INCARNATION

Although the description of Viṣṇu's assuming Mohinī form is found in almost all the Purāṇas² and also in the Epics yet it is only भाग० I 3 17³ that designates Mohinī⁴ as an avatāra of Viṣṇu, ranking thirteenth among his twenty-two avatāras. When, due to the churning of the Milky Ocean jointly by gods and demons, Dhanvantarī came up bearing the nectar in a pot, the demons, to the gods' disappointment, snatched it away from Dhanvantarī's hands and later they began to fight among themselves on the

distinct incarnations and not to an identical (७४४, the Varāha) incarnation. However, nothing definite can be said on this point.

¹ तृतीयमृषितर्गं च देवर्षित्वमुपेत्य स । तत्र सात्वतमाचष्ट नेष्टकर्म्यं कर्मणा यत ॥

² B g, मत्स्य० 231 भाग० VIII 8 ff, etc.

³ Vide महा० I 18 55 ff, and Vālmiki's Rāmāyaṇa I 45-42ff.

At both these places, however, Mohinī is given as the name not of the form but of the mysterious power (Māyā) by means of which Viṣṇu assumed that form.

⁴ 'धान्वन्तर द्वादशम त्रयोदशमेव च । अपाययत्सुरानन्यान्मोहिण्या मोहयन्त्रिया ॥'

point of priority of partaking of the nectar. Then Visnu, with a view to deluding the demons, assumed the form of a damsel called Mohinī whose amorous sports completely enchanted the demons to the effect that they entrusted Mohinī with the entire nectar for its allotment at her free will. Mohinī then gave away the entire nectar to the gods and resumed the original form.

In भाग० VIII 12, Visnu at Śiva's request is said to have again become Mohinī and to have enchanted Śiva to an extreme degree. In कृ० 16, Visnu and other gods are said to have assumed feminine forms and then attended on Pārvatī, during Śiva's absence, for protecting her from Andhaka and other demons. In none of these and similar other passages, however, has such change of form been designated as avatāra. Of course, there is no vital point which, while justifying the designation in the case of the Matsya, Kūma, Vaiṭha and Nṛsiṃha avatāras, can logically repudiate it in the case of the Mohinī form.

XIX HAYASIRAS (HORSE-HEADED) OR HAYAGRIVA (HORSE-NECKED) INCARNATION

(1) Sources

महाभारत XII 357, भागवतपुराण II 7 11, X 40 17, etc., etc.

(2) Details

महा० XII 357 gives details of this incarnation. When Visnu was sleeping on the waters about the end of a former deluge, two demons, *viz.*, Madhu and Kartabha, who had risen out of two drops of water dropped down by Visnu on a lotus-petal, saw Brahman creating the four Vedas. They at once rushed forth, seized the Vedas from Brahman's hands and entered the Rasā region in the north-east ocean. Then, at Brahman's appeal Visnu woke up and got ready for rescuing the Vedas. He changed his form and became

Hayasīras (horse-headed)¹ by means of his Aisvarya power. Then he entered the Rasā and made a loud mystic sound attracted by which the demons left off the Vedas in the Rasātala and came instantly to the spot of the sound. Meanwhile, Hayasīras picked up the Vedas, handed them over to Brahman, returned to his abode and became asleep again. Subsequently the demons, finding none at the spot of the noise and missing the Vedas at the place where they had left them, ran to Viṣṇu's abode in the waters and made Viṣṇu awake suspecting him to have stolen the Vedas. Then in the fight that ensued Viṣṇu killed² the demons, and thereby gave relief to Brahman who then set himself freely to the task of the new creation. Ultimately Viṣṇu resumed his original form.³

भाग० II 7 11,⁴ gives quite different details of this incarnation. It says that Viṣṇu became Hayasīras in the

¹ *Vide* description of Viṣṇu's horse-headed form given in महा० XII 357 47 ff. — “ ऐश्वर्या प्रयोगेण द्वितीयां तनुमाश्रितः ॥ सुनाविकेन कायेन भूत्वा चन्द्रप्रभस्तदा । कृत्वा हयशिरः शुभ्रं वेदानामालयं प्रभुः ॥ तस्य मूर्धा समभवद्योः सन्तत्रतारकाः । केशाश्चाभ्याभवन्दीर्घा रवेरशुसमप्रभाः ॥ कर्णावाकाशपाताले ललाटे भूतधारिणी । गङ्गा सरस्वती पुण्ये भ्रुवावास्ता महाद्युतिः ॥ चक्षुषी सोमसूर्यौ ते नासा सन्ध्या पुनः स्मृताः । कारस्त्वथ संस्कारो विश्वजिह्वा च निर्मिता ॥ दन्ताश्च पितरो राजन्सोमवा इति विश्रुताः । गोलोका ब्रह्मलोकश्च ओष्टावास्ता महात्मनः ॥ ग्रीवा चाभ्याभवद्वाजन्कालरात्रिर्गुणोत्तरा ॥ एतद्वयशिरः कृत्वा नानामूर्तिभिरावृतम् । अन्तर्दोषं स विश्वेशो विवेश च रसां प्रभुः ॥”

² Viṣṇu's achievement of killing Madhu and Kātabha is mentioned in numerous passages in the Epics (*e.g.*, महा० II 44, etc.) and the Purāṇas where no allusion is made to Viṣṇu becoming horse-headed and, in most cases, even to the demons' stealing the Vedas.

³ भाग० X 40, 17, thus briefly alludes to the Hayasīras' incarnation — “हयशीर्ष्णो नमस्तुभ्यं मधुकैटभमृत्यव” ।

⁴ “सत्रे ममास भगवान् हयशीरसाथो सान्तात्स यज्ञपुरस्कन्तपनीयवर्णः । छन्दोमयो मखमयोऽखिलदेवतात्मा बाचो बभूवुस्तृतीयः स्वसतोऽस्य नस्ता ॥” Although no mention is here made of Hayasīras, rescuing the Vedas from the demons' hands, yet his association with the Vedas, sacrifices, etc., is remarkable even here.

sacrifice held by Brahman and that there his breathings became significant words to others

In महा० XII 347 60¹, Viṣṇu to Nārada says that he, in the form of Hayaśīras in the north-west ocean, eats up the oblations offered to him with devotion. This statement perhaps implicitly identifies Hayaśīras with the conventional submarine fire (Vadavīnala) that is often described as a horse or a mare (Vadavī) and is also at some places² said to be a form of Viṣṇu.

(3) Remarks

This avatāra ranks ninth among Viṣṇu's twenty-two incarnations mentioned in भाग० II 7. In some places, the incarnation is also termed as Hayagrīva (horse-necked).

This avatāra bears much affinity with Viṣṇu's Matsya incarnation. The purpose of both is the rescue of the Vedas from the hands of some demon or demons who had snatched them away from Brahman. Curiously enough, the name of the demon robbing the Vedas from Brahman during the Matsya avatāra is Hayagrīva whereas in the present case the name of the incarnation itself is Hayaśīras or Hayagrīva.

XX GAJENDRAMOKSAKARA INCARNATION

The myth that Viṣṇu, at the appeal of the elephant-king (Gajendra) whose leg had been caught hold of by a crocodile, came speedily on his Garuda to the spot, killed the crocodile with his discus and rescued the Gajendra is described in the Epics and in the most of the Purāṇas. This advent of Viṣṇu,

¹ "अहं हयशिरा भूत्वा समुद्रे पश्चिमोत्तरे । विब्रामि सुदुत इत्थं कस्य च श्रद्धयान्वितम् ॥" Compare महा० XII 357 58 (स्थापयित्वा हयशिरा उदक्पूवे महोदधौ । वेदानामालयश्चापि बभूवाश्वशिरास्ततः ॥) where Viṣṇu is said to have assumed the Hayaśīras form in the north-east ocean.

² *Vide* हरि० I 40 19 (यः पुरा ज्वनलो भूत्वा अथैव संवर्तके विभुः । पातालस्थोऽयं वगतः पथौ तोयमय इति ॥) ब्रह्म० 70 etc. Contrast हरि० I 45, etc., where the submarine fire is identified with a son of sage Urva and not with Viṣṇu.

however, is designated as an avatāra only in भाग० II 7, 15-16¹ which gives it the thirteenth place among Visnu's twenty-two incarnations. Visnu's coming to the earth in this case involves neither change of form nor any other item usually found in the case of an avatāra and is parallel to his numerous simple appearances² on the earth mentioned in so many places. Hence it is not clear as to how the designation 'avatāra' not applied in those cases is justified in the present case.

XXI SANATKUMARA OR CATUSSANA INCARNATION

In भाग० I 3 6,³ where it ranks first among Visnu's twenty-two incarnations, the incarnation, as explained by the commentators, is named as Sanatkumāra. Visnu was born as a Brāhmaṇa boy, *viz*, Sanatkumāra, who practised the severe vow of Brahmacārya without breach. In भाग II 7 5,⁴ where it ranks fifth among Visnu's twenty two incarnations, it is named as Catussana, *i.e.*, a joint avatāra in the form of Sanaka, Sanandana, Sanātana and Sanatkumāra. Visnu practised austerities with a view to facilitating Brahman to create various Lokas, became Catussana as a result of his austerities and supremely propounded the principle of Self that had perished during the deluge of a previous Kalpa.

¹ “अथ सरस्युरुखेन पदे गृहीतो ग्रहेण यूथपतिस्त्रुजहस्त आर्त । आग्नेद-
मादिपुत्राखिललोकनाथ तीर्थश्रव श्रवणमङ्गलनामधेय ॥ श्रुत्वा हरिस्तमरणाधिंनमप्रमेय-
श्चक्रायुध पतगराजसुजाधिरुद्ध चक्रेण नक्रवदने विनिपाद्य तस्माद्वस्ते प्रगृह्य भगवान्कृप-
योञ्जहार ॥”

² *E.g.*, विष्णु० I 20 (where Viṣṇu personally comes down and rescues Prahrāda buried beneath mountains into the ocean), etc.

³ “स एव प्रथम देव कौमार सर्गमास्थित । चचार दुश्चर ब्रह्मा ब्रह्मचर्यमख-
रिद्धतम् ॥”

⁴ “तप्त तपो विविधलोकसिद्धयया मे आदौ सनात्स्वतपस स चतु सनोऽभूत् ।
प्राकल्पसेष्टवविनष्टमिहात्मतत्त्व सम्यग्जगाद मुनयो यदचक्षतात्मन् ॥”

Sages Sanaka, Sanandana, Sanātana and Sanatkumāra appear in numerous other places¹ where they are said to be Brahman's Mānasaputras and are not even implicitly identified with Viṣṇu

XXII KAPILA INCARNATION

(1) Sources

महाभारत III 106-107, etc , हरिवंश I 14-15 etc , विष्णुपुराण IV 4, etc , भागवतपुराण I 3 10, II 7 3, III 23 33, IX 8, etc , etc

(2) Details

The event generally associated with Viṣṇu's Kapila incarnation is the destruction of Sagara's sixty thousand sons² King Sagara was holding a horse-sacrifice when the sacrificial horse was robbed away by some one³ In their search⁴ Sagara's sons ultimately found the horse near Kapila⁵ Suspecting Kapila to be the horse-stealer, they attacked⁶ him but were all⁷ killed as soon

¹ *Bṛg*, भाग० III 15 ft where the sages are said to have cursed Jaya and Vijaya, Viṣṇu's gatekeepers, who disallowed them to enter Viṣṇu's abode in Vaikunṭha

² विष्णु० IV 4 says that Sagara's sons were of a wicked nature and that even previously gods had complained against them to Kapila, Viṣṇu's incarnation, who assured them that they (*viz*, Sagara's sons) shall very soon meet their end

³ हरि० I 14, विष्णु० IV 4, etc , say that an unknown man robbed the horse and, while being chased by Sagara's sons took him into the interior of the earth विष्णु० IV 4, however, further, describes Kapila himself as the horse-stealer भाग० IX 8, etc , say that it was India who stole the horse

⁴ हरि० I 14, विष्णु० IV 4, etc , say that they dug up the earth at Sagara's command

⁵ Kapila is said to be seated or asleep, engrossed in meditation

⁶ हरि० I 14, however, does not mention their attack on Kapila

⁷ हरि० I 14 says that the four, *viz*, Barhaketu, Suketu, Dharmaratha and Pāṇcajana survived and the rest died

as the sage looked at them with his slightly opened eyes¹ Later Sagara, learning² of his sons' fate, sent Aśvattha, his grandson, who³ propitiated Kapila, recovered the horse and got several boons⁴ from the sage⁵

The above is the only main event that is associated in all works with Kapila, explicitly or implicitly designated⁶ as an avatāra of Viṣṇu. Another important event, viz., the promulgation or exposition of the Sāṃkhya philosophy, is attributed to him only in the Bhāgavata which identifies him with the celebrated founder of the Sāṃkhya system. In

¹ महा० III 106, हरि० I 14, etc., say that it was the fire of Kapila's eyes that reduced Sagara's sons to ashes विष्णु० IV 4, भाग० IX 8, etc., say that they were burnt when Kapila looked at them, by the fire that came out of their own bodies due to their extreme fury भाग० IX 8 even repudiates the charge alleged against Kapila in other works and makes a strong defence in his favour — “स्वशरीराग्निना तावन्महेन्द्रहतचेतसः । महद्व्यतिव्रतमहता भस्मसादभवन्कृत्वात् ॥ न साधुवादो मुनिकोपभर्जिता मृपेन्द्रपुत्रा इति सत्त्वधामनि । कथं तमेतरोपमय विभाव्यते जगत्प्रवित्रात्मनि खे रजो भुव ॥ यस्येति सांख्यमयी दृष्टेर्ह नौर्यया मुमुक्षुस्तरते दुरत्ययम् । भवार्णव मृत्युपथ विपश्चित् परात्मभूतस्य कथं पृथङ्मति ॥ etc.”

² महा० III 106 says that it was Nārada who informed Sagara about the incident

³ In हरि० I 14, however, the achievement seems to be attributed to Pañcajanya Sagara's son, and not to Aśvattha

⁴ विष्णु० IV 4 भाग० IX 8, etc., record as one of the boons that Bhṛṅgīratha, Aśvattha's grandson, would bring the river Ganges to the earth from the heaven and would thereby confer salvation on Sagara's deceased sons

⁵ भाग० IX 8, etc., say that subsequently Sagara completed his sacrifice

⁶ All the Purāṇic passages noted above, and many others, explicitly mention Kapila, associated with the destruction of Sagara's son, as an avatāra of Viṣṇu. In महा० III 106-107, he seems to be implicitly identified with Viṣṇu. *Vide* his description “महात्मानं तेजोराशिमुत्तमम्”, “तेजसा दीप्यमानं तु ज्वालाभिरिव पावकम्”, “कपिलो मुनिस्तमः”, “वासुदेवेति यं प्राहुः कपिलं मुनिपुंगवम्”, “सुमहातेजा”, “तेजसो राशिं पुराणमुपिस्तमम्” etc., etc. *Vide* also Vālmiki's Rāmāyaṇa I 40 where this Kapila is explicitly identified with Viṣṇu

भाग० I 3 10,¹ II 7 3² and III 23-33, the exposition of the Sāmkhya system alone is attributed to Kapila, Viṣṇu's incarnation, but in भाग० IX 8³ he is clearly identified with the Kapila associated with the destruction of Sagara's sons भाग० III 23-33⁴ describes Kapila, Viṣṇu's incarnation, as son of Kardama and Devahūti. Devahūti, after giving birth to nine daughters deplored her past exclusive enjoyment of worldly and sensual pleasures and wanted to have an enlightened son who would impart to her real knowledge and dispel the gloom of her heart. Kardama assured her that God Viṣṇu, who had pledged himself to become his son, would soon be born of her to give relief to her mind. Then, in due time, Viṣṇu in the form of sage Kapila was born to her. Brahman, Marīci and other sages came to Kardama's hermitage on the banks of Sarasvatī to greet Kardama on Viṣṇu's birth as his son. Kardama then turned a recluse and Kapila delivered to Devahūti his lectures, entitled Sāmkhyatattvāmṇāya,⁵ on real and supreme knowledge. Devahūti, whose ignorance

¹ "पञ्चम कपिलो नाम सिद्धेश कालविप्लुतम् । प्रोवाचासुरये साध्य तत्त्वग्रामविनिर्णयम् ॥"

² "जशे च कर्दमगुह्ये द्विज देवहूत्यां स्त्रीभिः सम नवभिरात्मगतिः स्वमात्रे । ऊचे ययात्मशमल गुणसंगपङ्कमस्मिन्विधुयः कपिलस्य गतिं प्रपेदे ॥"

³ *Vide* above footnote

⁴ Compare भाग० II 7 3

⁵ The lectures are generally on the lines of the Sāmkhya system. But there is a vital difference *viz.*, that they recognise a God and place him above Prakṛti and Puruṣa. As such it is the Sesavara Sāmkhya system as lately developed. The Bhagavadgītā strain is also conspicuous throughout—(*vide* for instance, the passages like III 25 22 ff—मय्यनन्येन भावेन भक्तिं कुर्वन्ति ये दृढाः । मत्कृते त्यक्तकर्माणास्त्यक्तस्वजनवान्धवाः ॥ मदाश्रया कथां शृण्वन्ति कथयन्ति च । तपन्ति विविधास्तापानेतान्मद्गतचेतसः ॥ ते एते साधवः साध्वि सर्वसद्गुर्वर्जिताः । सद्गुणैश्च ते प्राथ्यं सद्गुणैश्च हृदि ते ॥) and *Bhagavadbhakti* is preached throughout. The usual twenty-four principles of Sāmkhya are given with the remark that some recognise Kāla as the twenty-fifth principle.

was dispelled, glorified Kapila and wondered as to how he, Supreme God as he was, could be borne by her in her womb. She, in obedience to Kapila's advice, practised further penances. Ultimately she attained salvation and her body, freed of worldly sins, became a holy river. Kapila, after enlightening his mother, took her leave and went off in the northern (or north-east) direction where the ocean welcomed him and gave him an abode to live in and where he, it is said, is still living engrossed in Yogic Samādhi, praised by the Siddhas, the Cājanas, the Gandharvas, the sages, the Apsarases and the Sāmkhyācāryas. In भाग० I 3 10, Kapila is described as chief of the Siddhas and to have expounded to Āsuri the Sāmkhyā philosophy which, though old, had perished with the lapse of time.

(3) Remarks

Although all the sources mentioned above recognise Kapila, associated with the destruction of Sagara's sons, as an avatāra of Viṣṇu, yet he does not appear to have been included in any list of Viṣṇu's ten incarnations. In भाग० I 3 10 and II 7 3 Kapila, the promulgator or propounder of the Sāmkhyā system, ranks respectively as fifth and third among Viṣṇu's twenty-two incarnations.

It has been shown above that while no other source seems to attribute the promulgation of the Sāmkhyā system to Kapila, recognised as Viṣṇu's avatāra and associated with the destruction of Sagara's sons, the Bhāgavata alone directly associates both the events with an identical Kapila who is said to be an incarnation of Viṣṇu. However, Śaṅkarācārya, in the course of his refutation of the Sāmkhyā system in his commentary on Brahmasūtra 2 1,¹ distinctly says that

१४ या तु श्रुतिः कपिलस्य ज्ञानातिशयं प्रदर्शयन्ती प्रदर्शिता न तथा श्रुतिविरुद्धमपि कपिलं मतं श्रद्धातुं शक्यं कपिलमिति श्रुतिसामान्यमात्रत्वात् । अन्यस्य च कपिलस्य सगरपुत्राणां प्रतप्तुर्वासुदेवनामस्मरणात् । "Vasudeva is given as an *alias* of Kapila, the destroyer of Sagara's sons also in महा० III 106 107 (*Viḍe* above footnote)

Kapila to whom tribute is paid in the Bhagavadgītā and other celebrated works is identical with Kapila-Vāsudeva who destroyed Sagara's sons and different from Kapila who promulgated the Sīmkhya system, since it is impossible that those works would pay respect to a system opposed to the Vedas. Some scholars hold that Śamkaiācārya professed the distinction of Kapila, venerated in the Bhagavadgītā and other works, from Kapila, the promulgator of the Sīmkhya system, merely with a view to getting rid of a difficulty in his own way. But it should not be ignored that the pre-Bhāgavata sources mentioned above say nothing that goes against Samkaiācārya's view.

XXIII YAJNA OR SUYAJNA INCARNATION

This incarnation is mentioned as Yajña in भाग० I ३ 12¹, where it ranks seventh among Viṣṇu's twenty-two incarnations, and as Suyajña in भाग० II 7 2² where it ranks second among Viṣṇu's twenty-two incarnations. Viṣṇu was born as Yajña or Suyajña, son of Ruci (a celebrated Purāṇic Prajāpati) and Ākūti. He married Dakṣiṇā, begot from her as sons Suyamas (or Yāmas) and other gods who gave relief to the afflicted three worlds during the Svāyambhuva age. As Viṣṇu in the form of Suyajña dispelled (अहरत्), through his sons (Suyamas and other gods) the miseries of the three worlds, he was given the epithet Hari by Svāyambhuva Manu.

Possibly, it is this incarnation that is mentioned as the first among Viṣṇu's seven incarnations in कूर्म० 51³ where, however, the name of the incarnation is not given and Viṣṇu is said to have been born as a Mānasa son of Ruci.

¹ "ततः सप्तम आकृत्यां रुचेयज्ञोऽभ्यजायत । स यामाद्यैः सुरगणैरपात्स्वाय-
नुवातरम् ॥"

² "जातो रुचेरजनयत्सुयमात्सुयज्ञ आकृतिसु नुरमरानथ दक्षिणायाम् । लोकत्रयमप्य-
महतीमहरत्प्रदाति स्वायभुवेन मनुना हरित्विनूत ॥"

³ स्वायभुवेऽन्तरे पूर्वं प्रकृत्या मानस सुत । रुचे प्रजापतेर्जज्ञे तदशेनाभवद्विजा ॥

Prajāpati and Prakṛti (not Ākūti during the Svītvambhuva age)

XXIV RṢABHA INCARNATION

This avatāra is mentioned in भाग० I 3, 13¹ II 7 10,² V 3 ff, etc. Viṣṇu was born as Rṣabha, son of King Nābhi and queen Merudevī. Rṣabha, though a prince, gave off all worldly connections, practised Jadavogacaryā and ultimately became Paramahansa. He viewed all worldly things, animate or inanimate, high or low, with a uniform eye and became unconscious even of himself. Many ordinary persons are said to have regarded him as a dullard or a mad-man, but enlightened sages knew his real work and made it their highest ambition to attain, by penances and self-control, Rṣabha's Paramahansa state. In fact, it is said, Rṣabha has shown by his career a unique and venerable path to the wise. In भाग० V 3 it is said that Rṣabha, when born, possessed the natural physical signs of an avatāra of Viṣṇu.

In both भाग० I 3 13 and II 7 10, this avatāra ranks as eighth among Viṣṇu's twenty-two avatāras.

XXV PRTHU INCARNATION

(1) Details

The story of Prthu, a pious king, along with that of his father Vena, a wicked king, occurs in मत्स्य० 10, कूर्म० 14, ब्रह्म० 2, विष्णु० I 13, हरि० I 5 6, भाग० I 3 14, II 7 9, IV 13—15, etc., but recognition of Prthu as an avatāra of Viṣṇu is found distinctly only in भाग० II 3 14, II 7, 9 and IV 13-15 and indistinctly perhaps in हरि० I 6.

(a) Vena was a wicked tyrannous and heterodox king. He prohibited the study of the Vedas, the performance of

¹ "अष्टमे मेरुदेव्या तु नाभर्जात उरुक्रम । दशैयन्त्वर्मे धीराणां सर्वाश्रमनमस्त्वृतम् ।"

² 'नाभेरसावृषभ आस सुदेविसूनुर्वो वै चचार समहर्जद्वयोगचर्याम् । यत्पारमहस्य-
मृषय पदमामनन्ति स्वस्थ प्रशान्तकरणा परिसुक्तसङ्ग ॥'

the daily and occasional sacrifices, the worship of gods, etc., and forced his subjects, to regard him alone as Supreme God. Then Brāhmanas and sages, unsuccessful in their attempt to move Vena to give up his tyranny and heterodoxy, put him to death, by means of their curse according to *मत्स्य०* 10, by means of their Humkṛta (sound of fury) according to *भाग०* IV 13-14 and by means of binding him over according to *हरि०* I 5, *ब्रह्म०* 2, *विष्णु०* I 13, etc. Then, according to most versions, they chained out the various parts of Vena's corpse and from its thigh and other lower parts rose up the Nisādas, the Dhīvaras and other inferior communities, whereas from its right arm rose up Prthu, a pious king, to the satisfaction of the sages and the Brāhmanas. *भाग०* IV 13-14, however, says that the sages, etc., after killing Vena with Humkṛta, went away and Sunīthā, Vena's mother, preserved the corpse. Later, when, after several years, evil omens began to occur followed by anarchy, the sages, etc., attributed the events to the kinglessness. They at once took Vena's corpse from Sunīthā and chained it out to give rise first to the progenitor of the Nisāda race and next to a couple, *viz.*, Prthu and Aris, whom they recognised to be incarnations of Viṣṇu and Lakṣmī respectively. *कूर्म०* 14, however, does not mention the details of the chaining of Vena's body, etc., but says that Prthu was born of Vena.¹

(b) As was expected, Prthu gave relief² to the sages, Brāhmanas and other pious people. He re-established

¹ The Kūrma Purāṇa throughout reads Vena and not Vena.

² *भाग०* II 79 (यद्वेनमुत्पन्नगतं द्विजवाक्यवन्नविष्णुष्टपौरुषभग्निरये पतन्तम् । ब्रह्मार्थार्थितो जगति पुत्रपदं च लेभे दुग्धा वसुनि वसुधा मकलानि येन ॥) says that Prthu saved Vena who was falling into hell due to his past wickedness and to the Brāhmana's curses. Contrast this statement with the statement in *भाग०* VII 1 that Vena, unlike Śiśupāla, etc., who on their death attained salvation and even union with Supreme God, was thrown into eternal gloom (Tamas) due to his hostile attitude towards God.

Dharma and righteousness and reintroduced the sacrifices, the worship of gods, the study of the Vedas, etc. His main celebrated achievement is that he milked off¹ the earth that had assumed the form of a cow and made her yield her entire riches, medicinal plants, etc., for the benefit of his subjects. He is also said to have held several celebrated sacrifices कूर्म० 14 says that in one of his sacrifices held in honour of Brahman (पितामहे मले) Vishnu appeared personally and granted several boons to Prthu.

(2) Remarks

In भाग० I 3.14 and II 7.9, this avatāra ranks respectively as ninth and seventh among Vishnu's twenty-two incarnations.

In मत्स्य० 10, कूर्म० 14 (where, as noted above, Vishnu appears personally and grants several boons to Prthu in a sacrifice held by him), ब्रह्म० 2, विष्णु० I 13, etc., Prthu is not even implicitly called an avatāra of Vishnu. In हरि० I 5-6, Prthu is not identified with Vishnu in the main description, but in the concluding verse of हरि० I 6, a line reads—"पृथुरेव नमस्कार्यो ब्रह्मयोनि सनातनः"² where the words "ब्रह्मयोनि सनातनः" may be taken to mean Vishnu as Nilakantha explains them. Thus here we find Prthu to be faintly identified with Vishnu. The Bhāgavata passages mentioned above prominently recognise Prthu as an avatāra of Vishnu and IV 15 even says² that Prthu possessed distinct natural signs of Vishnu's discus on his right palm and of Vishnu's lotus on his feet by which Brahman and other gods recognised him to be an avatāra of Vishnu.

Indeed, Vena's reign seems to afford sufficient occasion for an avatāra of Vishnu. No avatāra, however, is said to have taken place and the sages, etc., are said to have

¹ *Vide* also भाग० I 3.14 (श्रुतिभिर्योषितो भजे नवमं पार्थिव वपुः । दुग्धेनामोपधीर्विप्रास्तेनाय स उशत्तमः ॥), etc.

² "ब्रह्मा जगद्गुरुर्देवैः सहासृत्सु सुरेश्वरैः । वैन्यस्य दक्षिणे हस्ते दृष्ट्वा चिह्नं गदाश्रुतः ॥ पादयोरपरिविन्दं च तं वै मेने हरेः कलाम् । यस्याप्रतिद्वल चक्रमशः स परमेष्ठिनः ॥

themselves killed Vena. Even Prthu does not appear as an avatāra of Visnu in most sources and it seems that he was at a later stage made an avatāra with a view to bringing more harmony in the theory of Avatāra

XXVI DHANVANTARI INCARNATION

In भाग० VIII 8, etc., Dhanvantari, the last gem that came up with the nectar from the ocean as a result of the joint churning by gods and demons, is said¹ to be an incarnation of a portion of Visnu. The demons snatched away from his hands the nectar which subsequently Visnu, assuming Mohini's form, recovered for the gods. In भाग० I 3 17, Dhanvantari ranks twelfth among Visnu's twenty-two avatāras. भाग० II 7 21,² where Dhanvantari ranks sixteenth among Visnu's twenty-two avatāras, says that Dhanvantari is, as it were, glorious fame incarnate, that even (the utterance of) his name instantly dispels the ailments of persons suffering from chronic and acute diseases, that he has become immortal, that he has obtained share in sacrifices and that he has promulgated the science of longevity (Ayurveda) to the world.

Kūrma Purāṇa 51 gives a list of Visnu's seven incarnations some of which do not bear a name. Of these seven incarnations, only the last, *viz.*, the Vāmana incarnation, is common to the lists of Visnu's incarnations hitherto dealt with. The remaining six incarnations with their brief descriptions are in order as follows:

XXVII AN UNNAMED AVATARA³

Visnu during the Svāyambhuva age was born as a Mānasa son of Ruci Prajāpati and Prakṛti. This incarnation

¹ "स वै भगवतः साक्षाद्विष्णोरंशाश्लेषवः ।"

² "धन्वन्तरिश्च भगवान्स्वयमेवकीर्तिर्नाम्ना वृथा पुरुषज्ञां रुज आशु हन्ति । यज्ञे च भागममृतायुरवावरुन्ध आयुश्च वेदमनुशास्त्यवतीर्य लोके ॥"

³ 'स्वायम्भुवेऽन्तरे पूर्वं प्रकृत्या मानसः सुतः । रचे प्रजापतेर्नज्ञे तदशेनाभवद्द्विजा ॥' *vide* XXIII above

is possibly identical with the *Suyajña* incarnation dealt with above. No details, however, are mentioned here.

XXVIII AN UNNAMED AVATARA¹

During the *Svārocisa* age, *Viṣṇu*, along with the gods called *Tusitas*, was born of *Tusitā*. No more details are mentioned here.

XXIX SATYA INCARNATION²

During the *Uttama* age, *Viṣṇu*, the embodiment of *Satya* (Truth), was, along with the *Satyas*,³ born as *Satya*, son of *Satyā*. No more details are given. It may be that here is an allusion to the *Satyanīlāyana* form of *Viṣṇu* about which so many myths are current and which although not possibly traceable in earlier *Purāṇas*, appears to have become the most popular deity of occasional worship among all classes of people in India.

XXX HARI INCARNATION⁴

During the *Tāmasa* age, *Viṣṇu* along with the gods called *Haris*, was born as *Harī*, son of *Haryā*. No more details are given.

XXXI MĀNASA INCARNATION⁵

During the *Rāivata* age, *Viṣṇu*, along with the gods called *Mānasas*, was born as *Mānasa*, son of *Samkalpa*. No more details are mentioned.

¹ "तत पुनरसौ देव प्राप्ते स्वरोचियेऽन्तरे । तुषिताया समुत्पन्नस्तुषितै सह देवतै ॥"

² "उत्तमे त्वन्तरे विष्णु सत्यै सह सुरोत्तम । सत्यायामभवत्सत्य सत्यख्यो जगद्देव ॥"

³ Possibly, this is a particular class of gods.

⁴ "तामसस्यान्तरे चैव संप्राप्ते पुनरेव हि । हर्याया हरिभिर्द्वैहैरिवाभवद्दरि ॥"

⁵ "रैवतेऽप्यन्तरे चैव संकल्पान्मानसो हरि । संभूतो मानसै सार्धं देवै सह महाद्युति ॥"

XXXII VAIKUNTHA INCARNATION¹

During the Cāksusa age Visnu, along with the gods called Vaikunthas, was born as Vaikuntha, son of Vikunthā. No more details are given. Yet possibly this incarnation may be traced to earlier literature. The Deity of the hymns X 47 as well as the Deity and the seed of the hymns X 48—50 of the Rgveda Samhitā is Vaikuntha. India Brhaddevatā VII 49—60² gives a myth about the origin of this Vaikuntha India. Vikunthā, a demoness, practised severe austerities with a view to getting a son of Indra's achievements and merits and was granted many boons by Prajāpati. However, India, not liking the birth of an equal among his enemies and with a view to enabling himself to kill the demons, was himself born to Vikunthā to be called Vaikuntha India. This myth may be the germ of Visnu's Vaikuntha incarnation mentioned in कूर्म 51.

Among a few other incarnations of Visnu incidentally mentioned in the sources, only the Prśnigarbha incarnation briefly alluded to in भाग० X 3 deserves treatment here.

XXXIII PRŚNIGARBHA INCARNATION

When Kṛṣṇa was born to Devakī in his supreme form, he narrated to Devakī his birth as Prśnigarbha. In a previous creation, Prśnī³ and Sutaśas Prajāpati, who were ardently devoted to Visnu, practised penances for twelve thousand years. When Visnu manifested himself and asked them to select a boon, they, overpowered as they were by

¹ चाक्षुषेऽप्यन्तरे चैव वैकुण्ठ पुरुषोत्तम । विकुण्ठायामनौ जज्ञे वैकुण्ठे सह दैवतै ॥”

² “प्राजापत्यासुरी स्वासीद्विकुण्ठा नाम नामत । सेहन्तीन्द्रसम पुत्र तेपेऽय सुम-
हत्तप ॥ सा प्रजापतिर कामाह्वलेपेऽय विविधान्वरान् । तस्या चेन्द्र स्वय जज्ञे जिर्वा-
सुर्देत्यदानवान् ॥ eto ” Vaikuntha Indra's achievements are detailed in subsequent lines.

³ The Vedic Prśnī, described as the mother of Maruts, eto, may be the germ of this Prśnī.

Māyā, did not choose salvation but elected to have a son like Visnu himself. Visnu, failing to find his own parallel, himself became their son, *viz*, Prāṇigarbha. Later Prāṇi and Sūtapas were born as Aditi and Kāsyapa when Visnu again became their son, *viz*, Vāmana. Finally, the parents were again born as Devakī and Vasudeva and Visnu again became their son, *viz*, Kṛṣṇa. Kṛṣṇa at his birth manifested his supreme form to Devakī with a view to making her recollect that in the previous existences he was born to her as Prāṇigarbha and Vāmana. Kṛṣṇa now granted salvation to Devakī and Vasudeva after their present existence. No events of the Prāṇigarbha incarnation are mentioned.

Other incarnations of Visnu which are found at some places in slight allusions¹ cannot be treated here because they do not bear much significance and because they are too numerous to be exhausted.

Although the feature of incarnation is attributed with exceptional predominance to Visnu, generally regarded as Supreme God, yet most other gods and goddesses as well as many sages, demons, etc., etc., are occasionally alluded as incarnating themselves on the earth for various reasons. Of these only God Śiva and Goddess Isānī seem, from various allusions in the sources, to be more important and deserve a brief treatment.

3 INCARNATIONS OF SIVA

Śiva, like Visnu, appears to be an original supreme god whose parentage is never alluded to. Yet he is sometimes said to have been "born" or to have "incarnated" himself during various creations. Thus in कूर्म 7, he is said to have been born from Brahman's forehead, during the course of the creation subsequent to Boar-God's raising up the earth, and further to have created, at Brahman's request, the Rudras, the Kāpardins, etc. In कूर्म 9, Brahman is said to

¹ *Eg*, कूर्म 14 where Sūta calls himself an avatāra of Viṣṇu

have become Visnu's son, Śiva to have become Brahman's son and Visnu to have become Śiva's son¹ Further, in कूर्म० 11, Śiva is said to have come out of the mouth of Brahman who was practising penances. Śiva is then said to have split himself into two portions, viz, the masculine and the feminine. He is further said to have divided his masculine portion into eleven Rudras (called Kapālīśa, etc.) and his feminine portion into four kinds of Śaktis (called Lakṣmī, etc.) described as Saumya, Asaumya, Śānta and Aśānta.

In कूर्म० 30, Vyāsa to Arjuna says that Śiva shall incarnate himself on the earth during the Kali age with a view to the welfare of his devotees, that he shall re-establish the Śrauta and Smṛita creeds, that he shall impart to his disciples the knowledge of the supreme principle called Brahman which is the quintessence of the entire Vedānta and that he shall propound to them the Dharmas prescribed by the Vedas¹ In this description may be an implicit allusion to the popular belief of Saṃkarācārya being an avatāra of Śiva.

Many avatāras of Śiva have been distinctly mentioned in the Kūrma Purāṇa. In कूर्म० 19, Śūka, son of Vyāsa, is called an avatāra of Śiva² Further, in कूर्म० 53, Śiva's twenty-eight avatāras are mentioned which are in order as follows — (1) Sūtāra, (2) Madana, (3) Suhotra, (4) Kamkana, (5) Lokākṣi, (6) Yogīndira, (7) Jaigīṣavya, (8) Dadhivāha, (9) Rṣabha, (10) Bhṛgu, (11) Ugra, (12) Atisama, (13) Vālin, (14) Gantama, (15) Vedadāsin, (16) Gokarna, (17) Gubhāvāsa, (18) Śikhandadhṛk, (19) Yajñmālin, (20) Attahāsa, (21) Dārūka, (22) Līṃgahn, (23) Mahāyāma,

¹ "कलो रुद्रो महादेवो लोकानामोष्णर पर । करिष्यत्यवताराणि शङ्करो नीललोहित । श्रौतस्मार्तप्रतिष्ठार्थं भक्तानां हितकाम्यया ॥ उपदेक्ष्यति तज्ज्ञानं शिष्याणां ब्रह्मसंशितम् । सर्ववेदान्तसारं हि धर्मान्वेदनिर्दिष्टान् ॥ etc."

² "द्वैपायनाच्छुको जज्ञे भगवानेव शङ्कर । अग्रांशेनावतीर्योऽयं स्व प्राप परमपदम् ॥" It may be noted that Parāśara, Vyāsa's father, is here said to have begot Vyāsa after propitiating Śiva.

(24) Muni, (25) Dindamundīsvara, (26) Sahisnu, (27) Soma svīman and (28) Nakulīśvara. All these avatāras are said to have occurred in various Kaliyugas. Four Brāhmanas, viz., Sveta, Śvetasikha, Śvetīśva and Śvetalohita, described as very learned and sanctifying,¹ are said to have been born with Śiva in every incarnation as his disciples with a view to the Brāhmanas' welfare and to the establishment of the Vedic creed. Further details of these incarnations are almost insignificant.

Vīrabhadra, whom Śiva created² for destroying Dakṣa's sacrifice, does not appear to have been designated as an avatāra of Śiva. Some other incarnations³ as well as mere descents⁴ on the earth of Śiva are mentioned at some places, but it is not possible here to exhaust them.

4 INCARNATIONS OF ISANĪ

कूर्म० 11 seems to identify Isānī with the feminine portion of Śiva's original form. Isānī divided herself into Śaktis mentioned above and then, at Brahman's request, was born as Sati, daughter of Dakṣa. Married to Śiva by her father, she further at the sacrifice held by Dakṣa, killed herself, pained at Śiva's humiliation at Dakṣa's hands. Subsequently she, pleased at Himavat's penances, was born as Pārvatī, daughter of Himavat and Menī. At her own request Himavat married her to Śiva.

¹ ' . ब्राह्मणा वेदपारगा । शिष्या एते महात्मानः सर्वावर्षेषु योगिनाम् ॥
विमला ब्रह्मभूयिष्ठा ज्ञानयोगपरायणा ॥ कुर्वन्ति चावताराणि ब्राह्मणानां हिताय च ।
योगेश्वरायामादेशाद्ब्रह्मदत्तस्यापनाय वै ॥ ये ब्राह्मणा सेस्मरन्ति नमस्यन्ति च सर्वदा ।
तर्पयन्त्यर्चयन्त्येतान्ब्रह्मविद्यामवाप्नुयुः ॥

² *Vide* सत्स्य० 72, कूर्म० 15, ब्रह्म० 37, भाग० IV 5, etc.

³ *Eg.*, *Vide* हरि० I 54, where Aśvatthāman is described as an avatāra of Śiva.

⁴ *Eg.*, *Vide* कूर्म० 16, "मोहापसदं लोकमवतीर्य मदीतले । चकार शंको भिक्षां हितायेषां द्विजैः सह ॥"

5 INCARNATIONS OF OTHER GODS, SAGES, DEMONS, ETC

It is impossible here even to allude briefly to the numerous incarnations of other gods, sages, demons, etc., mentioned in the Epics and the Purāṇas महा० I, हरि० I 53-54, etc., give a very long list of gods, sages, demons and others who were born on the earth in human forms during the Kṛṣṇa Incarnation. Numerous other incarnations of other gods, etc., are also mentioned in numerous incidental allusions in these works ¹

¹ The twenty-five incarnations of Vyāsa, the Mārtanda Incarnation of Sūrya, the Jina Incarnation of Brhaspati, etc., have been incidentally noted above. *Vide* for other similar cases, मत्स्य० 14 (where Acchoda's births as Satyavatī and Aṣṭakā are mentioned), 61 (where Agastya is identified with Agni and Māruta), स्क० 14, (where Dakṣa is said to have been born as Prācetas), ब्रह्म० 71, विष्णु० V 1 and भाग० X 85 (where Devakī's first six sons are identified with Sadgarbhas), विष्णु० IV 14 ff and भाग० VII.1 (where Jaya and Vijaya are identified with Hiraṇyākṣa and Hiraṇyakaśipu, Ravana and Kumbhakarna, Śiśupāla and Dantavakra at different stages), etc., etc.

SECTION II

HISTORY

RELATIONS OF THE EAST INDIA COMPANY WITH THE NAWAB WAZIRS OF OUDH, 1798-1805

BY

SURESH CHANDRA MATHUR, M A

Research Scholar, History Department University of Allahabad

I

The accession of Nawab Saadat Ali Khan on the *musnud* of Oudh marks a great and a fundamental change in the politics of the day and henceforth a growing influence of the East India Company in the affairs of Oudh is the most remarkable feature. It was on 21st January, 1798, that Wazir Ali who was placed at the *musnud* after the death of Nawab Asafuddaulah, having been removed from the *musnud*,¹ Nawab Saadat Ali Khan was appointed Nawab Wazir of Oudh. The fact was accomplished at Benares through the agency of Mr Cherry who announced this decision to Saadat Ali Khan and presented him a draft treaty for acceptance. The substance of the treaty² runs as follows —

Article 1 — It guaranteed that the amity and friendship between the contracting parties shall be perpetual and that the friends and enemies of both shall be treated as such.

Article 2 — It laid down that the East India Company was bound to defend the dominions of Nawab Saadat Ali Khan against all enemies. "And with a view to fulfil this engagement and at the same time provide for the protection of their own dominions the English Company having largely established there military establishment, by the addition of new levied regiments, both of infantry and cavalry, the Nawab Saadat Ali Khan, in consequence thereof agrees, in addition

¹ Wazir Ali was removed from the *musnud* due to (a) his low birth (Tafizihul Ghafilin, by Abu Talib, p 108), (b) dangerous character—(Life of Lord Teignmouth, p 439)

² Treaties and Engagements, Aitchison, Vol I, pp 118-120

to the annual subsidy paid by the late Nawab Asafuddaula to the English Company, being 56, 77, 638 rupees, to pay in perpetuity the further sum of 19, 22, 362 rupees making altogether the sum of seventy-six lakhs of rupees "

Article 3 —The subsidy was to commence from the 21st January, 1798, the date of the Nawab's accession, 'and the said Nawab engages that it shall be punctually discharged, month by month as it becomes due ¹

The articles fourth, fifth and sixth laid down that the arrears due on former engagements shall be paid up at once and further that an allowance of one lakh and fifty thousand rupees shall be paid to Wazu Ali, while the stipends to the Begums at Benares and Farrukhabad formed a part of the subsidy of seventy-six lakhs of rupees

The seventh article of the treaty was important inasmuch as it laid down that 'The Governor-General Sir John Shore Baronet on the part of the East India Company agrees that the English forces maintained in the country of Oudh for its defence, shall never consist of less than ten thousand men, including Europeans and natives, cavalry, infantry and artillery. And if at any time it should become necessary to augment the troops of the Company in Oude beyond the number of thirteen thousand men including European and natives, infantry, cavalry and artillery, the Nawab Saadat Ali Khan agrees to pay the actual difference occasioned by the excess above the number, and in the same manner if the troops of the Company from any necessity, should be less than eight thousand men, including infantry, cavalry, artillery, natives and Europeans, a deduction shall be made from the annual stipend of seventy-six lakhs of rupees, equal to the actual difference of men below the specified number' ²

Article 8 —It meant that Saadat Ali Khan agreed to pay the fortress of Allahabad to the Company and that the

¹ *Treaties and Engagements, etc*, Aitchison, Vol I, p 119

² *Ibid*, Vol I, p 119

Company shall be answerable to the Nawab for the income of the Ghats

Article 9—In case the cantonments at Fitehgarh and Cawnpore were found unsuitable they could be shifted to other places on the expenses of the Nawab

Article 10—The Nawab agreed to pay a sum of twelve lakhs of rupees to the Company for having placed him on the *musnud*

The eleventh article of the treaty again has an important bearing considering the future course of events. It laid down that 'if contrary to the sincere intentions and exertions of the said Nawab the payment of the *kist* shall fall into arrears the said Nawab Saadat Ali Khan engages and promises that he will then give such security to the Company for the discharge of the existing arrears, and the future regular payment of the *kists*, as shall be deemed satisfactory'¹ The twelfth article of the treaty aimed at an attempt to be made for curtailment of the superfluous charges of the public establishments of the Nawab. The thirteenth article of the treaty, however, again pointed out that 'As the political interests of Nawab Saadat Ali Khan and the English are the same, it is expedient that all correspondence between the Nawab Saadat Ali Khan and any foreign power or state shall be carried on with the knowledge and the concurrence of the Company, and the Nawab Saadat Ali Khan agrees and promises that no correspondence contrary to the tenor of this article shall be carried on by him'² The rest of the articles of the treaty were aimed at a total extirpation of all the Europeans (excepting the Company's officials) from the state and a desire for the maintenance and giving force to the commercial treaty. 'The treaty contained no provision for the good government of the province, and except for the look of the thing, the omission was

¹ Treaties and Engagements, etc., Atchison, Vol I, p 121.

² *Ibid*, p 121

not perhaps under all the circumstances of much consequence"¹ It is not difficult to find out that the treaty resembled more a dictation from a higher to a subordinate power. The article thirteen of the treaty clearly indicates that the Nawab was definitely relegated to a subordinate position with reference to the Company. The bait of getting the *musnud* of Oudh was perhaps too alluring for Nawab Saadat Ali Khan to have ever thought of the terms of the treaty which were agreed to in toto. Thus, the Nawab at the very threshold of his official career was saddled with certain disabilities which he accepted without demur.

The treaty having been concluded it was on the 25th March, 1798, that Sir John Shore left the shores of India. Sir Alured Clarke the Commander-in-Chief acted as the Governor-General till 17th May, 1798, when Earl of Mornington arrived at Calcutta as the Governor-General of India.

It will be well at this stage to study the situation as Lord Mornington found when he came to India as the political situation was in a large measure responsible for the future trend of the policy followed by the Governor-General specially with reference to Oudh. The 'Zaman Shah menace' was one which hovered for a pretty long time and was a source of some botheration to the preceding Governor-General Sir John Shore, no less to the Earl of Mornington. The forecast of Sir John Shore regarding the invasion of Zaman Shah at the time of his departure is at best a statement of a proposition of which he was himself not sure. He only mentions "Whether Zaman Shah will ever invade Hindustan is a matter of doubtful speculation"² It will be therefore just in the fitness of things to trace in brief outline the events which were responsible for the threatened invasion of Zaman Shah and the hopes and fears entertained by the East India Company.

¹ Garden of India, Irwin, p. 102

² Despatch to Earl of Mornington, by Sir J. Shore, dated the 7th March, 1798

The event is all the more important as it formed the cornerstone of the entire superstructure of the policy pursued by the Earl of Mornington towards the Kingdom of Oudh. At the death of Timur Shah the ruler of Afghanistan, Zaman Shah, the fifth son of Timur Shah, ascended the throne on the 23rd May, 1797. At this time the territory in his possession 'comprehended the principalities of Cashmere, Lahore, Peshawar, Kabul, Balkh, Khulm, Kandhar, Multan and Herat, those of Khelat, as well as Persian Khorassan acknowledged him as suzerain'.¹ Having established himself on the throne of Kabul Zaman Shah appears to have determined on an invasion of India, a measure to which he was stimulated by Mirza Ashun Bakht a prince of the royal family of Delhi who had fled to Cabool in Timur's reign as well as by ambassadors who arrived about this time from Tippoo Sultān and who had made great pecuniary offers to the king on condition that he should attack the British.² Elphinstone throughout in the course of his book makes mention of the fact that Zaman Shah had an infatuation for the conquest of India and whenever he found time he thought of this conquest. Even in the year 1793 according to him Zaman Shah had a mind to invade India and the main purpose seems to be to defeat the Mahrattas and to reinstate Shah Alam on the throne of Delhi. In the year 1794 Zaman Shah collected a force to proceed to Peshawar with a view to invade India. He was, however, disturbed by the action of his brother Humayun who coveted his throne. All the historians are agreed that the first invasion of Zaman Shah of the Punjab commenced at the close of 1795. He marched up to Hasan Abdal. G. P. Tate, the author of *The Kingdom of Afghanistan*, gives a number of antecedent causes which must have ultimately

¹ History of Afghans, by J. P. Ferrier, translated by W. Jesse, p. 108.

² An Account of the Kingdom of Cabul and Its Dependencies, by Elphinstone, Vol. II, p. 308.

led Zaman Shah to arrive at this decision to invade India in the year 1795¹ At this place (Peshawar) he gave audience to the Vakils of Muzaffar Khan Sadozai, Nazim of Multan, and of Bhawal Khan, ruler of Bhawalpur² 'An embassy also arrived from the wazir of the Badshah of Farang³ Shah Zaman also sent off messengers to Shah Alam, Emperor of Hindustan, from Peshawar' The king had been, however, for a week only at Hasan Abdal that he received the intelligence of the invasion of the west of Khorassan by Agha Muhammad Khan Kujjur, King of Persia, this attack determined him to immediately return to the defence of his dominions He arrived at Peshawar on January 3, 1796, according to Elphinstone's calculations Evidence is not wanting which goes to prove that the schemes of Zaman Shah were encouraged and even supported by the various rulers of India On the 26th October, 1794, Ghulam Muhammad Khan, the Rohilla usurper in Rohilkhand, was defeated by the British force under Sir Ralph Abercrombie and in the year 1795 he crossed the Punjab evidently with a view to induce Shah Zaman to intervene on his behalf⁴ Abu Talib the writer of *Tafizihul Ghafilin or History of Asafuddaula* also points out that after performing the pilgrimage Ghulam Muhammad Khan had a mind to join the king of Persia, Zaman Shah It is also clear that Nawab Asafuddaula of Oudh also was inclined towards the king of Afghans and he also despatched an agent at the same time to the court of Sadozai⁵

¹ The Kingdom of Afghanistan, by G P Tate, Chapter XI, p 96

² *Ibid*, Chapter XI, p 96

³ Elphinstone's Cabul, Introduction, Vol I p 56

⁴ Mirat-i-Abbasi or History of Bhawalpur

⁵ Mirat-i-Abbasi or History of Bhawalpur Tafizihul-Ghafilin 'when the rumour of Shah Abdali's approach was current news reached Calcutta of intention on the part of Jhao Lal to join the Abdali'

The Persian history 'Tarikh-i-Salatīn' dealing with history of the kings of Afghanistan is quite explicit on this point and suggests that Zaman Shah had even correspondence with Shah Alam at Delhi. At one place he writes

’در حسینی که سیه هکری بهرار و دو نسب و دو هکری رسیده بود
 از گذراندن عمور نمود و منزل حسن آندال را فخر حدام فرمود -
 قصار سپهراده همارون با سلطان احمد بسرس که خوانی رعنا
 بود بخمال عرم کسمر در محال لیه رسیده و در رنر در حدی فروکش
 کرده بود و کالم لیه حمر سده نابانصد سوار بر سرس ناهمه
 و نصرب کلوله بسرس را از با انداحمه او را و سنکریه کرده برن ساه
 زمان در محال حسن آندال فرسیدان در ساه زمان حورسید
 سده حسن حان فرلناس را فرمود ساچسمال همارون سپهراده همارون
 را نکرلک نمدان از حد مه تراورد بعد او را در محقه نسانده احوب
 کاندل ارسال کرد - اگرچه در انکا مراسلات بی در بی ساه عالم
 گوهر من عرب الدن عالمگر نانی گورگانی نانساه دهلی رسد که
 دهلی نماند لیکن چون نفس بنوسب که سپهراده محموند اراده
 معی و عرم دستخبر ندهار دارد لا حرم عالی گوهر را عذر حواسمه
 مراعب قندهار کرده¹ -

The above passage expressly mentions the fact that Shah Zaman received a number of invitations and messages from Shah Alam in order to help him for the reinstatement on the throne of Delhi. Again, having settled his affairs in the western front Zaman Shah collected a large army of 150,000 Duranis horse and after crossing the Indus by a bridge at the Indus entered Lahore on the 1st of January, 1797. Again, we find that the original idea of Zaman Shah to offer help to the needy Shah Alam seems to have been dropped. The reason of it was the attack and revolt of his brother Mahmud.² The fact has been referred to in Tarikh-i-Salatīn

¹ Tarikh-i-Salatīn, p 165

² Elphinstone's Cabul

دانداسه پس از سنکان مستقر است که دهلوی رود که عراض
امرا دهلوی رسید مسعودی آنکه محمود نام عازم دستگیر دهلوی
است لهذا دانداسه مسیح عزم کرده عازم دهلوی شد¹

In this connection it might be noted that Zaman Shah was related to Shah Alam and hence the invitations of Shah Alam could have a force different from others in efficacy and acceptability² This invasion is important also from another point of view It enables us to realise as to how far the resistance which these invaders met at the hands of Sikhs was effective enough to check their further inroads The area between Oudh and the territories of Zaman Shah was mainly inhabited by the Sikhs 'The confederacy of Sikh chieftains offered no opposition to the advance of the Afghan hordes'³ The invaders followed the policy of winning over and conciliating the Sikhs of the place as Cunningham puts it 'to render his visionary supremacy an agreeable burden' Several Sikh chiefs joined him but the proceedings of his brother Mahmud recalled him before he had time to make any further progress But the Sikhs were perhaps less dismayed than the beaten Mahattas and the ill-informed English Tarikh-i-Salatn points out that as soon as he entered Lahore سنکان ناظران فرا رسیدند He, however, before he went back sent expeditions against the Sikhs of the Manja and Amankot Sahib Singh was made to submit In fact the stay of Shah Zaman was of a very short duration and the Sikhs being in a close touch with the affairs of Afghanistan could understand the situation well They evidently did not attach much importance to the invasions of Shah Zaman probably because they were confident that the disruptions in

¹ Tarikh-i-Salatn, p 166.

² Franokhn, Shah Alam, Appendix IV, p 250 Elegy by Shah Alam

'شاه تیمور که دارد سر دمی داس * رود ناهد که داید نمود گاری ما'

³ Kingdom of Afghanistan, G P Tate, p 104

his western frontier would not afford him any opportunity to pursue his Indian conquests with singleness of purposes and tenacity of will. The account of the various invasions of Shah Zaman before the arrival of Earl of Mornington leaves no room for doubt that they were not merely raids for collecting the rebel chiefs or for enjoining greater administrative efficiency in his own dominions. They clearly had an ulterior object in view, of defeating the Mahrattas and reinstating Shah Alam on the throne of Delhi.

The Mahrattas were another important power which cannot be easily ignored in any attempt at consideration of the political situation of that time. They were in the beginning of the century the most powerful nation of India and had then crippled and subverted for all practical purposes the Muhammadan power in the northern India. The battle of Pampat (1761) had, however, dealt a severe blow on the Mahratta power, yet the rise of Mahadaji Sindiah marked an epoch in the Mahratta history, and he 'bestrides like a colossus for two decades'.¹ With the treaty of Salbye the position of this Mahratta leader was raised from that of decline to aggrandisement. The entire reign of Mahadaji Sindiah was marked by a continuous struggle against the Rajputs, the Sikhs and the Rohillas who became his inveterate foes, and at the time of his death the Rajputs were his irreconcilable enemies, the Sikhs were unfriendly to him while the Rohillas were smarting under the old wrongs and defeat.² By the year 1785 Mahadaji had mastered Agra and by the same time he had coalesced with the confederate Sikhs to the effect that of all then joint conquests on either side of the Jumna he should have two-thirds and the Khalsa shall have the remainder.³ This scheme, however, could not materialise due to the incident which culminated in the blindness of Shah

¹ *Fall of the Mughal Empire*, Sarkar, Foreword

² *History of Mahrattas*, Grant Duff

³ *Indian Fractions*, Browne, Vol II, p 29

Alam in 1788. This affair entirely changed the conditions and the Sikhs found themselves merely as dependents or servants of the Mahiattas.¹ During the course of the ten years three invasions were directed against the Sikhs at Patiala. General Perron succeeded De Boigne as the commander of Daulat Rao Sindhia's largest force in the year 1797. The systematic plan of Perron would have enabled him to carry his arms up to Lahore had not Daulat Rao's influence been endangered by the presence of Holkar and Perron's own purpose defeated by the hostility of George Thomas,² a free lance who had established himself there. George Thomas was helped by Holkar and supported by Lackwa Dada and other Mahrattas who entertained a jealousy of the French Commandment.³

In relation to the British people, however, the Sikhs first of all attracted notice in the year 1784. They were by that time molesting the Nawab Wazirs of Oudh. But the Sikhs 'had learnt to dread others as well as to be the cause of a fear'. Shortly afterwards the British Resident was asked to enter into a defensive alliance against the Mahrattas. The British people later also accepted the services of 40,000 Sikh housemen who posted themselves near Delhi to watch the motions of Sindhia.⁴

The dominant note of the political situation was the general feeling of hostility of all the powers against Daulat Rao Sindhia. The Rajputs and Sikhs were nursing their age-long prejudices and even grievances, Perron had become virtually independent of Sindhia, Holkar was openly hostile and inimical towards Sindhia, while the English had not so far followed any consistent policy for or against the Mahiatta ruler. The designs of Zaman Shah as have already been

¹ History of Sikhs, Cunningham, p. 121.

² 'A Free Lance from Tipperary' in 'Strangers Within the Gates,' by G. Festing.

³ Franklin, Life of George Thomas, pp. 1, 78, 107, etc.

⁴ Auber, Rise and Progress of British Power in India, Vol. II, pp. 26-27.

trace the exact course of policy ever since. From the general tenor of the policy which he followed in India it can hardly be doubted that he came to India fully prepossessed regarding certain matters. 'Schooled in European systems of policy, he was strongly prepossessed in favour of defensive alliances'.¹ The various letters which he despatched to the Secret Committee of the Hon'ble Court of Directors and the Right Hon'ble Henry Dundas while he was at the Cape of Good Hope undoubtedly prove the suspicion to be correct. "The inclination of my opinion at present rather leads me to think, that a general defensive alliance between all the existing powers of Hindustan (Tippoo perhaps alone excepted) against the expected invasion of Zeman Shah"² would be the best. At another place also in his letter to Henry Dundas dated 25th February, 1798, he mentions his apprehensions regarding Zaman Shah.³ In all the letters he expresses his great concern of the kingdom of Oudh due to the contemplated invasion of Shah Zaman, and while yet at the Cape of Good Hope he says, "I cannot consider the idea of the invasion of Zeman Shah as a mere visionary danger." The appraisement of the danger of Zaman Shah which he so much talks of may be correct and probably was correct in view of the dangers to the state of Oudh, but the persistence of this fear even when the danger had disappeared is certainly a proof of his prepossessions regarding the matter. Throughout his entire transactions with the State of Oudh the real and later, even the supposed danger from Shah Zaman had been made too much of perhaps for the furtherance of the ends in view.

Thus as he arrived on the shores of India on the 17th May, 1798, he was face to face with a critical situation of which he had formed his own estimate based on the perusal of the official correspondence between his predecessor and the

¹ Life of Lord Teignmouth, p. 480

² Despatches of Lord Wellesley, Vol. I, p. 12

³ *Ibid*, Vol. I, p. 16

authorities in England. More important affairs, however, in the south attracted his attention and the actual interference in the affairs of Oudh did not begin till the arch-enemy of the Britishers in the south (Tipu) was completely reduced. Even while busy in the south, his deep concern regarding the threatened attack from Zaman Shah and later the bad condition of the Nawab's army always engaged his attention and he was never tired of giving due instructions to the Resident and men in power in the north for their persuance. The danger from Zaman Shah was all the more emphasised when the Governor-General and the Nawab Wazir of Oudh received further communications from him asking them for help and assistance in the objects he had in view.¹ The information which the Governor-General had, as has been previously pointed out, was very vague and disjointed.² Shah Zaman had created an alarm by coming up to Lahore after crossing the Indus at Attock. Earl Mornington, therefore, seriously considered the imperative need of meeting the threatened invasion by means of defensive alliances by allying himself with the Mahrattas, Sikhs and the Rajputs. The moment he received the letters from Zaman Shah we find him communicating with Daulat Rao Sindhia emphasising the express necessity of his leaving the southern theatre of his activities and coming to the north.³ The entire correspondence is clear on this point that the Governor-General strained his nerves in carrying through his policy but Daulat

¹ Letter of Earl of Mornington to the Rt Hon H Dundas, 6th July, 1798 Despatches Vol I, p 89

² Letter from Earl Mornington to Resident at Lucknow, 21st September, 1798 Despatches, Vol I, p 267 Letter from Earl Mornington to Clive, 24th September, 1798 Despatches, Vol I, p 268 Letter from Earl Mornington to Dundas, 12th November, 1798, Despatches, Vol I, p 342

³ Letter from Mornington to Dundas, July, 6, 1798, Vol I, p 89 Letter from Mornington to Col W Palmer, July, 8, 1798, Vol I, pp 20-21 Letter from Mornington to Col Kirkpatrick, August, 19, 1798, Vol I, p 220

Rao Sindhia was not keen¹ about the affairs in the north and hence did not engage to become a party to the defensive alliance. Even as late as the 10th December, 1798, the Earl of Mornington writes to Lord Clive, "The Mahratta power on the North-Western Frontier of Hindustan, is nearly in the same state and temper as the Sikhs and Scindiah's return (the object of my early and unremitting endeavours) appears as distant and uncertain as ever." A despatch from the Earl of Mornington to the Hon'ble Court of Directors dated 13th June, 1799, however, points out that "Both the Mahrattas and Sikhs on the North-Western Frontier of Hindustan have manifested the most anxious desire to cooperate with our forces in opposing the progress of the Shah." But the above movement of the two powers took place when the Shah had already left India on the 4th January. It was, therefore, quite natural on the part of the Governor-General to look up and try for defensive alliances in order to prevent the kingdom from falling under any mishap due to its very strategic position. It has been already pointed out that probably the Mahrattas and Sikhs being too near the invaders' territories were able to discover the emptiness of the threatened invasion and hence did not make any special preparation to combat it. But in as far as he is concerned Lord Mornington's further course of measures of precautions are justified.

It is during the course of these negotiations with the different powers with a view to seek their cooperation that the strategic position of Oudh and the menace of Zaman Shah towards it was brought into limelight. The internal affairs of Oudh and its incapacity to defend herself against any foreign attack was also made quite evident. The question of the seriously bad condition of the army of Oudh was discussed

¹ Letter from Mornington to Lt-Col John Collins, Resident with Sindhia, October 26, 1798, Vol I, p 311. Letter from Mornington to Resident at Poonah, 10th November, 1798, Vol I, p 337.

as early as September 16, 1798, in a letter of Earl of Mornington to Sir James Craig "one defect has necessarily attracted your notice, the useless or rather the dangerous condition of the Vizier's own army. The subject is at present under my consideration and I see but one effectual mode of obtaining a serviceable army in the Vizier's pay." Here the Governor-General frankly mentions of his resolve of 'The substitution of regular regiments from Company's service in place of the Nawab's own troops, or in other words such an increase of our force in Oudh as would warrant nearly a total reduction of the Nawab's present army,¹ believing it to be essential for the internal stability and tranquillity of the condition of Oudh. While discussing, again, the necessity of collecting and mobilising the forces to the frontier of Oudh Sir Henry Craig writes to the Earl of Mornington, "No sort of service can be expected from the Nawab's army, and I am confident that without a total change in the policy of the court and the manners of the people there exists no possible means by which it can ever be rendered such as can merit that the smallest degree of confidence should be placed in it."² The view held by the Governor-General is further corroborated by Craig when he says 'The money now expended on them is thrown away and can only be rendered subservient to the object of general defence, by being appropriated to the increase of the Company's army.' Time and again the rotten condition of the Oudh army was brought into bold relief and at one place Sir Henry Craig in a letter dated 13th October, 1798, expresses his deep concern regarding the army. I would be content that they should be useless, but I dread them being dangerous unless some step is taken with regard to them. I should be almost as unwilling to leave them behind me as I should be to leave the fortress of the enemy.³ The

¹ Lord Wellesley's Despatches, Vol I, p 263

² *Ibid*, Vol I, p 282

³ *Ibid*, Vol. I, p 358

letter of the Governor-General to the Court of Directors dated 21st November, 1798, is, however, conclusive on his determination of carrying through effectual reforms in Oudh, and his keen desire to effect considerable improvement in the civil and military establishments of the kingdom of Oudh. A general outline of the policy he intended to follow with regard to Oudh has been traced out in his letter¹ to J Lumsden, the Resident at Lucknow. He proceeds with two or three leading considerations. Firstly, that at the time of the death of Almass Ali Khan the Company ought to succeed to the power of Almass 'and the management if not the sovereignty of that part of the Doab which he now rents ought to be placed in our hands, a proportional reduction being made from the subsidy.' The effect of this he believed would be to strengthen the North-Western Frontier. Secondly, the state of the Nawab Wazir's troops being very bad there was an imperative need of disbanding the 'whole of his army, with the exception of such part of it, as may be necessary for the purposes of State, or of the collection of the revenue.' The Governor-General at this point explicitly mentions that the army shall consist of 'an increased number of the Company's regiments of infantry and cavalry to be relieved from time to time, and to be paid by His Excellency.' Thirdly, that the large number of Europeans in the kingdom of Oudh was a source of mischief and that none of them should be suffered to remain there. The question of civil and revenue administration was, however, deferred for a future consideration as the Governor-General was then leaving for Fort St George with a view to superintend personally the affairs at Mysore.

It may now be recalled that in the month of January, 1799, the forces under Sir Henry Craig were mobilised to camp at Anoopshahr and a contingent of troops of Oudh under the command of Almass had joined with four battalions

¹ Lord Wellesley's Despatches, Vol I, pp 386-88

of sepoy and one of Nujeeb's twelve guns and some horse. The letter of Sir Henry Craig dated 12th January, 1799, addressed to the Earl of Mornington may be considered as the last straw on the camel's back, depicting the utter uselessness of the Nawab's army 'I am well assured that the Nabab's troops are neither armed, nor clothed, nor there is a gun in the district which is put under General Martine's command that can be made use of'¹ A number of factors again contributed to a more serious consideration of the problem of the defence of Oudh against the impending attack of Zaman Shah and other conspiracies against Oudh. On the 14th January, 1799, occurred the murder of Mr George Frederick Cherry, a Resident at Benares, at the hands of Wazir Ali who fled away to Bhotwal territory though he was later caught and handed over to the Company. Startling disclosures were made regarding the motives and machinations of Wazir Ali. He had sent a wakil to Zaman Shah with presents with a view to obtain his support in overthrowing the British power in Oudh². Another disclosure much more dangerous than the first was one which brought to light a letter from Ambaji, Sindhia's principal commander, addressed to Wazir Ali showing that a treaty was concluded by 'Ambaji on the part of Daulat Rao Scindiah with Vizier Allie'. The letter was discovered among the papers of Wazir Ali which were taken at the attack of the Madhoo Das Garden. The news of the outrage had created considerable alarm and emotion at Lucknow. The British Government demanded help from the Nawab for quelling the disturbance and maintaining law and order. 'When called upon to join with his forces the British army for the chastisement of the offender, he (Nawab) found an excuse which his avarice, his timidity, his desire of ease and hatred of exertion,

¹ Lord Wellesley's Despatches Vol I, pp 408-04

² Earl of Mornington to Court of Directors, 12th February, 1799. *Ibid* Despatches, Vol I, p 430

all combined in leading him eagerly to adopt " He stated his suspicions of his troops and represented them as too void, both of discipline and fidelity, for any advantage to be expected from aid ¹ In view of the evidence before us testifying to the utter uselessness of the army of the Nawab it is difficult to agree with Mill in his insinuations that at this juncture the fault lay with the timid character of the Nawab and that otherwise the army could have served the purpose all right Undoubtedly it accelerated the speed of the military reforms in Oudh which were already under contemplation, and strengthened the conviction regarding their early enforcement The urgency of the situation in the south, however, prevented any attempt at translating the contemplated reforms of Oudh in practice It is after the fall of Seringapatam on the 4th May, 1799, and the arrival of the Governor-General at Fort William on the 14th September, 1799, that we find the Oudh question being seriously tackled

Having taken into consideration the facts detailed above it would be quite fair to conclude that the condition of the army in the kingdom of Oudh was awfully bad It could not at all be relied upon in meeting any danger from any external power But the question that is most material in this connection is whether the Nawab was responsible for the bad army of Oudh It cannot be doubted that the Nawab Wazir of Oudh cannot be completely exonerated from this blame on his name and character, yet the policy which the predecessors of the Earl of Mornington followed was calculated to discourage all efficiency in the army and aimed at substitution of it by the British army As early as 29th November, 1768, in a treaty² concluded between the Company and Nawab Wazir Shujauddaula it is apparent that he was required to restrict the number of men to 35,000 with a qualifying clause

¹ Mill, History of India Vol VI, Ch IX, p 165

² Atchison, Treaties, Engagements, etc, No XXXV, Vol I, p 92

that 'none of them to be equipped or drilled like English troops'¹ On the accession of Asafuddaula in the year 1775 a new treaty² was concluded which raised the payment of the British troops to Rs 2,60,000 a month for each brigade that crossed his border In the year 1781, however, at a personal interview with Warren Hastings at Chunnu a new treaty³ was negotiated with a view to give relief to the Nawab Wazir by the withdrawal of all the English troops except a single brigade and one additional regiment But due to certain circumstances beyond control and due to the weakness of the Nawab's Government it was decided that the withdrawal of the British forces could not be effected An arrangement⁴ was, however, made in 1787 by which the Nawab's payment of the subsidy was fixed at Rs 50,00,000 a year in lieu of all claims and a large portion due to the British Government was remitted In the year 1797, again, Sir John Shore paid a visit to Lucknow to induce the Wazir to reform his administration and to pay part of the increased military establishment which was found necessary to keep up At this juncture an agreement was made with Nawab Asafuddaula by which the Nawab Wazir undertook to pay for an additional regiment of European and one of native cavalry provided the cost did not exceed five and half lakhs of rupees⁵ The last treaty concluded between Nawab Saadat Ali Khan and Sir John Shore was that of the 21st February, 1798⁶ The subsidy to be paid by the Nawab was increased to seventy-six lakhs a year and a minimum of 10,000 men of the British force was fixed up with a provision that it could be increased at the

¹ Aitchison, *Treaties, Engagements, etc*, No XXXV, Vol I, p 92

² *Ibid*, No XXXIX, Vol I, p 98

³ *Ibid*, No XLI, Vol I, p 103

⁴ *Ibid*, No LXII, Vol I, p 107

⁵ Aitchison, *Treaties and Engagements, etc*, No XLIV, Vol I, p 118

⁶ *Ibid*, No XLV, Vol I, p 119.

expense of the Nawab Wazir. Thus we find a systematic policy on behalf of the East India Company of saddling the kingdom of Oudh with the British forces without making any attempt to improve the native army of the Nawab. In fact, all the official correspondence is clear that the Governor-General ever since his arrival in Hindustan always contemplated a complete disbandment of the native forces and substituting them with the British forces. We do not find a single instance when any desire is shown on the part of any official that the native army was to be improved. It has been said, 'The authorities of the East India Company having determined upon disbanding the army of the Nawab Vizier and of replacing it by their own troops were only awaiting a favourable opportunity for carrying their designs into effect, when the rumours of the expedition undertaken by Zaman Shah for the purpose of invading India presented them with the desired excuse.'¹ It has been suggested by the author of 'Oudh Vindicated' that the object of the Earl of Mornington of turning out the Europeans was due to their apprehensions lest their exactions and acts of injustice may not get wind. It is, however, difficult to agree with this view held by the author for it was not an innovation on the part of the Earl of Mornington but it was the constant practice of all his predecessors.² The reason perhaps lay in the danger and the mischief they might create in the kingdom and not in the views as the author of 'Vindication of Oudh' holds.³ Yet when all is said the fact remains that no attempt at improvement of the Nawab's army was ever contemplated, while the question of the disbandment of Oudh forces was always in the mind of the Governor-General which he ultimately translated into practice.

¹ Oudh Vindicated by M. Muhammad Mussehooddeen. Hereditary Native of Oude, Chap. II, p. 23.

² Papers relating to the Settlement of Europeans in India Tracts and Pamphlets.

³ The authors of 'Spoliation of Oude' hold the same view.

III

The fall of Seringatam on the 9th May, 1799, for once relieved the Governor-General from all the worries in the south. He arrived at Fort William on the 14th September, 1799, but took his seat in the Bengal Council on the 17th September 1799. From that time we find him taking a lively interest in the proceedings of Oudh. James Mill suggests that the negotiations appeared to the Governor-General so important that 'he was unwilling to entrust them to the qualifications of the Resident Mr Lumsden and called Mr Scott'.¹ The views of the Nawab regarding the introduction of the military reforms are brought in limelight by the letters that passed between the Resident Mr Scott and the Governor-General. At one place the Resident writes, "The evident design of the Nawab is to temporize and delay, that he may enjoy as long as possible the fruits of the present system of secret agency and intrigue".² At another place he writes, "I am led to conclude that while he is determined to fulfil with minute regularity the peculiar engagements with the Company, his views are directed to the enjoyment of full authority over his household affairs, hereditary dominions and subjects according to the most strict interpretation of the clause of the 17th Article of the treaty executed at Lucknow—I have no conception that he aspires either now or in prospect to political independence".³ The correspondence regarding the contemplated reform, however, began about the 24th October, 1799.⁴ The topic of the introduction of military reforms in Oudh was finally broached by the Earl of Mornington in a letter dated 5th November, 1799, to Nawab

¹ Letter of Sir Alured Clarke, *Ut Supra*, O P III, pp. 4-6

² Letter of Scott to Governor-General, 7th September, 1799.

³ Letter of Scott to Governor-General, 20th September, 1799

⁴ Earl of Mornington to the Hon H Dundas, 24th October, 1799, Vol II

Wazir¹ The Wazir was told about the imperative necessity of army reforms in Oudh. The argument advanced, emphasising the need of such reforms, was, the precautions requisite against the attack of Zaman Shah the more so when his designs were brought to light due to the Seringapatam discoveries. But, the one argument adduced now which was so far held in abeyance laid down that the Company was bound "to defend the dominions of Your Excellency against all enemies." Further, that the normal number of soldiers (13,000 men) would not be enough to meet the situation during the troubled times, here he referred to the seventh provision of the treaty of 1798 which provided that the number of forces could be increased beyond that number. The Nawab Wazir was therefore asked to disband 'the numerous disorderly battalions in his service with a view to enable him to defray the expenses of the additional British force then requisite for the safety of Oudh constantly. No headway was yet made in the direction of military reforms in Oudh that the Nawab Wazir at a meeting on the 12th November with the Resident at his own place imparted to the Resident 'his secret though determined resolution of abdicating the government.'² The Nawab Wazir, however, did not permit the matter to be known to the Governor-General till 20th November. From the conversation which Nawab Saadat Ali Khan had with the Resident it was apparent that the Nawab found it impossible to conduct the affairs of the Government under 'existing circumstances,' as he felt that he could not manage the government with satisfaction to himself or to the advantage of his subjects. Besides his mind was not disposed to cares and anxieties and fatigues of the government. He, however, suggested to nominate any one of his sons to the *musnud* in his place while he would content himself by

¹ Despatches of Lord Wellesley, Vol II, pp 132-35

² Letter from Lt-Col Scott to Mornington, 22nd November, 1799 Despatches, Vol II, p 145

living on his own money outside the limits of Oudh. What the Resident could gather from probing deep in the matters and psychology of the Nawab's mind was that his complaints 'consisted of general accusations against the refractory and perverse disposition of the people at large, of complaints against the fidelity and zeal of the men immediately about his person, of the arrogance of some of the Aumils and of the open disobedience of others'¹ The Resident felt that the timidity and avarice of the Nawab was to a large extent responsible for this determination on the part of the Wazir. The paper was duly submitted to the Governor-General with very slight modifications and corrections by the Nawab Wazir. The question of the military reforms when mooted out by the Resident the Nawab Wazir immediately brushed aside as being totally unnecessary in view of the propositions to be submitted before the Governor-General. The Resident thereupon acquiesced in this suggestion of the Nawab. It is difficult to understand how the abdication of the Nawab Wazir and the succession of his son to the *musnud* could have led the Wazir to dispense with the necessity of reform in the military administration. The mere abdication of Nawab Saadat Ali Khan and the succession of his son on the *musnud* could not possibly have improved military matters. It naturally leads one to suspect that probably at this very stage the Nawab wanted to evade the immediate reform in Oudh army. But it is equally a surprise that the Resident who was so much keen about immediate reform in the army administration of Oudh should, on the mere suggestion of the Nawab to abdicate acquiesce in his proposals and abandon the question altogether. One can legitimately suspect that the Resident contemplated an abdication of a very different kind which would possibly result in greater advantages to the Company and would thus dispense with the necessity of all military

¹ Letter of Lt.-Col. Scott to Earl of Mornington, 22nd November, 1799, Vol II, p. 147 Despatches

reforms in Oudh. The Governor-General apparently was, however, keen 'to establish with the consent of the Vizier the sole and exclusive authority of the Company within the province of Oudh and dependencies or at least to place our interests on an improved and durable foundation'.¹ He makes clear mention of the fact that he intended to profit by the event to the utmost practicable extent. The views which he later so emphatically expressed are seen in his letter to Resident on 21st November, 1799, when he says, "his Lordship thinks it cannot be too much encouraged, and that there are no circumstances which shall be allowed to impede the accomplishment of the grand object which it leads to. In this his Lordship proposes that the sons of the Vizier shall be no further mentioned than may be necessary for the purpose of securing to them a suitable provision".² The Wazir when approached with the ideas expressed above regarding the negotiations naturally felt very much upset and showed his deep concern at the annihilation of his own authority.³ The Governor-General apprised his intentions to the Resident that he should try to bring round the Nawab Wazir to accept the terms offered by the Governor-General.⁴ The Governor-General purposely refrained from making any mention of the question of succession as he felt that the question was not originally suggested by the Wazir but was the outcome of the discussion that took place. The reply of the letter dated 22nd November, 1799, sent through the Resident brings into bold relief the desire of the Earl of Mornington that the Company should be vested with the perpetual 'exclusive administration of the civil and military Government of Oudh and its

¹ Earl of Mornington to Secret Committee of Directors, Despatches, 28th November, 1799, Vol II, p 55

² Oudh Papers, *Ut Supra*, pp 31-32

³ Conference of Wazir with Resident on 15th December, 1799

⁴ Lt Kirkpatrick on behalf of Governor-General, Despatches, 16th December, 1799 Vol II, p 158

dependencies with such ample powers as shall enable the Company to act with vigour and promptitude in every branch and department of the State"¹ The letter opens with a very sympathetic statement showing that the conditions pointed by the Wazir were true and that the Governor-General was aware of the various difficulties of the administration. It is interesting to note that the Governor-General pretends to know the causes of his abdication now which in the course of the previous letter to the Resident he wanted to know from him as he said he never could really understand the circumstance that led to this precipitate action on the part of the Nawab. He puts forth a number of reasons suggesting thereby that the method of abdication contemplated by the Nawab Wazir would not meet the ends in view. Firstly, the resolve of Nawab Saadat Ali Khan to abdicate with all the treasures for his own maintenance would place the successor and the Company in an awkward position. He would thereby be alienating a part of the Company's security. Secondly, it would be doubtful if the peace of mind of Saadat Ali Khan shall be restored by seeing his son on the *musnud* and the sentiments of jealousy and distrust would not be aroused in due course of time. Thirdly, even if he quitted Lucknow it was doubtful whether he shall maintain his peace of mind at any other place in Oudh or Company's dominions under circumstances when his son shall succeed him. Fourthly, no dependence and reliance could be placed upon the young successor to correct the evils which baffled the knowledge and experience of Nawab Saadat Ali Khan himself. Further, that the interests of the Company would be directly injured by a transfer of the *musnud* of Oudh to one of his Excellency's sons, because none of these young princes could be qualified as his Excellency to discharge either the duties of alliance and friendship towards the Company or those of protection towards the people

¹ Minute by Governor-General, Despatches, 16th December, 1799 Vol II p 186

of Oudh¹ Having thus put forward a plausible case against abdication in the manner proposed by the Nawab Saadat Ali Khan, the Governor-General emphasised that the Nawab was placed on the *musnud* by the Company and maintained there and 'he is bound towards the Company by certain public engagements the just performance of which it is equally the duty of his Excellency and the Governor-General to secure'² Hence the Nawab's abdication in favour of anybody else than the Company "would exonerate his Excellency from his engagements under the late treaty" The need of an unqualified abdication in perpetuity in favour of the Company was emphasised The question of the military reforms was still urged in case the Nawab disagreed and declined to adopt the sort of terms proposed by him In the meantime the negotiations were being carried out constantly between the Resident and Nawab Saadat Ali Khan The Nawab was never prepared to accept the terms as enunciated by the Governor-General and always deemed it to be an annihilation of his own authority³ As the question of military reforms was again revived the Nawab Vizier did not agree to the radical reforms proposed by the Governor-General As late as 15th January, 1800, the Nawab sent a paper to the Earl of Mornington pointing that according to the letters of the Governor-General the arrangements for the additional troops were not to take effect until funds should be provided for their support by dismissal of my battalions which was not till then done 'Yet dreading his Lordship's displeasure and with the sole view of pleasing him I am compelled to grant my assent to the introduction of the plan'⁴ The Nawab Wazir at last sent a memorial to the Governor-General putting forth all the grievances that he entertained and entreating a

¹ Minute by Governor General, Despatches, Vol II, p 185

² Minute by Governor-General p 185

³ Letter of Resident to Mornington, 18th December, 1799

⁴ Papers, *Ut Supra*, pp 77-78

sympathetic consideration of the state of his affairs. The memorial, however, met with a very rough treatment at the hands of the Governor-General who refused to hear the complaints detailed there on the ground that it was not submitted through the proper authority. The matters reached crisis when on the 20th and 28th January, 1800, the Resident complained to the Governor-General that the Nawab Wazir was placing impediments in his way of execution of the army reforms by (a) insisting that the English additional force was not to be dispersed in small bodies over the country, (b) withdrawing the statement which had been required of the amount of distribution of his own battalions, (c) delaying to issue the *Purwannahs*, necessary to ensure the provisions to the additional troops. The suspicions of the Governor-General were already very much roused when no favourable reply was forthcoming from the Nawab. He was convinced that the proposition of Nawab Saadat Ali Khan to abdicate was only directed towards creating artificial delays in the proposed military reforms in Oudh¹. Yet he was certainly hopeful and expected that 'advantage will certainly flow from what had passed'². The complaints forwarded by the Resident to the Governor-General elicited a very strong condemnation of the methods and behaviour of the Nawab of Oudh. The Governor-General traced the entire policy towards the military reform and the continued requests on the part of the Nawab Wazir for the immediate reform in his army³. He dwelt at length on the policy pursued by Saadat Ali Khan specially after he gave out his wish to abdicate and his subsequent recantation. He indulged in an unscathing criticism on the suggestion of the Nawab to the Resident Mr. Scott that the treaty provided for the dangers merely of a transient and

¹ Earl of Mornington to Secret Committee of Directors, January 25, 1800 Despatches, Vol II, p 199

² Lord Wellesley's Despatches, Vol II, p 203

³ Earl of Mornington to Nawab of Oudh, 9th February, 1800, Vol II, pp 209-12

temporary nature and pointed out to the Nawab that even the dangers of a permanent nature came within the purview of the treaty. He again emphasised the immediate need of dismissal of the disorderly troops not only as a measure of economy but as one based upon 'soundest maxims of prudential policy'. Hence again the two most important points, *viz*, the reform of the military establishments in the kingdom of Oudh and the provision of funds for the regular monthly payment of Company's troops in Oudh were emphasised in the course of the letter. The spirited remonstrance on the part of the Governor-General had the desired effect and the Nawab at last agreed to expedite the introduction of the reforms in the military establishment of the kingdom of Oudh. The Earl of Mornington expresses with a feeling of satisfaction with regard to the situation at Oudh, 'I trust that is now nearly accomplished, namely, the substitution of an efficient military force under the Company's authority in place of the Nawab Wazir's dangerous and undisciplined army'.¹ The accomplishment of this step lent him further hope and courage to tackle the various other problems of the kingdom of Oudh 'with vigour and effect'. The despatch of Marquis of Wellesley (now no longer Earl of Mornington) to the Secret Committee of the Directors, dated 9th June, 1800, signifies the regular progress of reforms in the Nawab Wazir's army when he wrote, 'I have great satisfaction in informing your Honourable Committee that the reform of the Nabab Vizier's military establishment has proceeded in regular progress, without any material opposition or difficulty although with many symptoms of dissatisfaction on the part of his Excellency, and of the most turbulent class of his troops'.² The British troops were augmented to the extent they were proposed and it was expected that the additional subsidy payable by the Nawab Wazir was to amount to

¹ Earl of Mornington to the Rt Hon H Dundas, 5th March, 1800 Despatches, Vol II, p 236

² Despatches, Vol II, p 273

about fifty lakhs of rupees annually. The new levies raised to supply the place of the troops to be stationed at Oudh were then confined to two regiments of native cavalry and two regiments of native infantry including in the latter the British volunteers who served in the late war and were on their return to these provinces from the Carnatic.

The fact is that from the very beginning the Governor-General adopted rather an uncompromising attitude in his dealings towards Oudh Nawabs.

The annihilation of the Nawab Wazir's forces were naturally resented by the Nawab but when the question of abdication was stressed in favour of the Company the Nawab Wazir yielded to the first condition. He, however, did it most reluctantly. "The truth is," says Mill, "that the vivacity of the Governor-General in the pursuit of the object was far too great. Had the sincerity of the Wazir been ever so indisputable, it was one thing to abdicate in favour of his son, a very different thing to abdicate in favour of the East India Company."¹ The stationing of a permanent sort of forces in Oudh even in peace establishment was most unpopular and 'when this point was settled, all the benefit was attained of arbitrary will.'² One cannot fail to discover that after all the transactions of the Company with Oudh were not merely intended to the good of that country itself, but that good was considerably eclipsed by the Company's own ends which aimed at making Oudh a bulwark against any foreign or internal commotion lest the peace and harmony of the British Indian territories may be disturbed.

IV

The question of the military reforms having been settled Lord Wellesley intended 'to take into consideration without delay the means of introducing such improvements in the

¹ Mill, History of India, Ch IX, p. 184

² *Ibid*, Ch IX p 176

civil administration'¹ in Saadat Ali Khan's affairs as were long overdue because of the security of the Company's interest in that country and to the prosperity and happiness of the people. The Governor-General believed that unless a radical reform took place in the 'resources of the State' the present reform in the army cannot be deemed more than partial remedies of the existing evil². He seems still to have been obsessed by the danger of the invasion of Zaman Shah and hoped that by the time the said Afghan ruler was busy in the affairs of his own country the Governor-General would 'place the security of that province (Oudh) beyond the reach of danger from any attempt either of Zaman Shah or of any other foreign power'³. In the meantime, however, the circumstances so moved as to give further opportunities for Lord Wellesley to materialise his schemes of a thorough reorganisation of Oudh affairs. In the month of November, 1800, when demand for the second body of new troops was presented to the Wazir he complained to the Resident 'The state of the collections of the country is not unknown to you, you know with what difficulties and exertions they are realised and, hence I feel a great degree of solicitude and apprehension lest, if I should fail at a season of exigency my responsibility should be impeached'. In another part of the same letter the Nawab writes, "Formerly on the plan proposed for the reform in the military it was written, 'that the resources for the expenses of the new troops would be found in the reduction of those of his Excellency'. Now that you write, to have the charges of other new troops added to the debit of the State, when the reduction of the military has not yet supplied resources for the payment of the charges of the former new troops, how can I take upon myself to defray the charges of

¹ Marquis of Wellesley to Secret Committee of Court of Directors, dated 9th June, 1800, p. 274. Vol II, p. 274.

² The Marquis Wellesley's letter to Secret Committee of Court of Directors, dated 9th June, 1800. Despatches, Vol II, p. 274.

³ *Ibid*, Despatches, Vol II, p. 274.

those new troops without subjecting the *simas* to the imputation of a breach of faith"¹ There can be no doubt that the grounds on which the Nawab was proceeding were quite correct but Lord Wellesley interpreted them in other light When Lord Wellesley was apprized of the situation he wrote in a letter² to the Wazir the mismanagement which the Nawab's territories were experiencing He dwelt at length on the bad discipline of the Nawab's troops and expressing the need of reform in the civil administration he pointed out, 'It was always evident that these precautions must prove fruitless if the defects of the civil administration of Oudh should be suffered progressively to impair the fundamental resources of the State' The entire letter is a systematic attempt to bring home to Nawab Saadat Ali Khan the rottenness of the administration for which the Nawab was himself responsible In a fit of showing all the inequities of the administration Lord Wellesley went to the length of comparing the prosperous condition of the Company's territories with the Nawab's own dominions pointing out thereby that in the absence of any external danger it could only be ascribed to the utter mismanagement of the Nawab himself Having the abovementioned circumstances in view the Governor-General explained to the Nawab that 'I am satisfied that no effectual security can be taken against the ruin of the country until your Excellency shall transfer to the exclusive management of the Company, the civil and military government of your Excellency's dominions'³ Perhaps realising that such an abdication of all authority would not be agreed to by the Nawab he gave him an alternative of 'making a perpetual cession to the Company of such portion of your Excellency's territories as shall be adequate to defray these indispensable charges' The arguments

¹ Papers, Oudh, *Ut Supra*, III, p 141

² Letter from Marquis Wellesley to Nabab Vizier of Oudh 22nd June, 1801 Despatches, Vol II, pp 431-32

³ Lord Wellesley's Despatches, Vol. II, p 434

which were considered to be in favour of cession were previously weighed by the Governor-General and believed 'that no other portion of the Vizier's dominions possesses so many political advantages as would be derived to the Company from the possession of the Doab'¹ The idea was of placing the dominions of the Wazir in a position 'beyond the reach of foreign connections and foreign dangers', hence the country of Rohilkhand was also to be included with a view to form a ring fence round the Wazir's territories. Another argument that was adduced in favour of the possession of those territories was that they would involve 'less violence to the pride and prejudice of the Wazir inasmuch as they were actually added to the possessions of his family by the British arms. But again this defence of the ceded territories was expected to mean that no division of military force would be required for the express purpose of protecting the Vizier's territory'²

The reply which was sent by the Nawab signified a complete disagreement of the conditions advanced by Lord Wellesley. The Nawab declared it frankly that the opinion which was expressed by him to the Resident was nothing more than a private talk with a view to clarify matters which even the Governor-General always meant to encourage.³ Feeling that the disbandment of the troops would not meet the end in view he naturally told it to the Resident. The Nawab Wazir further expressed his absolute inability to divest himself of his 'patrimonial dominion' and as regards the perpetual cession of a portion of the territory the punctual payment of the subsidy on his behalf precluded every necessity of any cession of territory.⁴ The chief criticism by the

¹ Despatches, Vol II, p 427 — Letter to Scott, 22nd January, 1801

² Letter of Wellesley to Scott, 22nd January, 1801, Despatches, Vol II, p 427

³ Letter of Nawab Vizir to Wellesley, 14th March, 1801

⁴ Letter of Wellesley to Nawab, 5th April, 1801 Vol II, pp 474—82

Governor-General of Nawab Wazir's letter lay that in emphasising the punctual payment of the subsidy the Wazir had very conveniently ignored the 'substance and spirit' of his own late communications to Lieutenant-Colonel Scott purporting to the failure of his own resources. In order to bring home to the Nawab Wazir the imperative necessity of agreement to one of the conditions the Governor-General quotes a case in which extortion was practised by the Nawab's amils under his very nose. It is evident, however, from the perusal of the Governor-General's letter that he did not very much insist upon a complete abdication of authority but insisted on 'defraying the expense of our defensive engagements'.¹ It is interesting to consider the leading principles on which the right of demanding a territorial cession was founded.

1 The evils and abuses of the Nawab's administration left no room for any doubt as regards the gradual though systematic impairing of the resources of the State which was to result ultimately in the breakdown of the payment of the pecuniary engagements with the Company.

2 'The resources which had been found inadequate to the regular payment of subsidy must prove still more insufficient to support the additional burthen of a heavy area.'²

3 'The punctuality of the Wazir's payments does not diminish nor in any way affect the right of the Company to demand a satisfactory security against the operation of the evils of which the existence was evident and effect certain.'

4 The pledge of his Excellency's private resources in addition to the resources of the State was quite uncertain, and that species of security from its very nature must be very fluctuating and precarious, and as it must also depend on the resources of the country it must be consequently affected by

¹ Letter from Wellesley to Nawab Wazir, 5th April, 1801 Despatches, Vol II

² Despatches, Vol II, p 484

the same causes which produce a failure in the payment of the subsidy

5 'Neither the letter nor the spirit of the existing treaty could justify the British Government in delaying the demand of satisfactory security to a period of time, when such a demand must prove altogether nugatory'¹

6 'The right of demanding satisfactory security is not confined to the extent of the established sum of seventy-five lakhs of rupees. It is equally applicable to the funds necessary for defraying the expenses of the additional force' The necessity of such a force having been proved already, it was made abundantly clear that the Company was not going to indulge in any half measures involving 'partial-interference' or 'imperfect modifications of a system of which every principle is (was) founded in error and impolicy, and every instrument tainted with injustice and corruption' It is interesting to note that in the reply to the questions raised on account of the letter of the Governor by the Nawab Wazir the Governor-General in the course of another letter has made it apparent that the steps he was going to take could not be relaxed to any extent. He goes on so far as to point out the benefits that would accrue to the Nawab on account of the proposed cession of the territory on his behalf to the Company. The ceded territories being taken at the amount of the actual Jumma by the Company the Nawab shall show quite a handsome sum as the actual collections are invariably inferior to the present Jumma. With regard to the expectation of the Nawab to enhance the Jumma it would not be possible to do it as considerable portion of them is already fixed at as high a rate as can be expected and that the collections have been secured solely by the ability and exertion of Almass Ali Khan who, due to the infirmities of old age, was desirous of relinquishing the charge and that in the hands of other aumils

¹ Lord Wellesley's Despatches, Vol II, p 485

the diminution of the amount of collections was inevitable. He was further reminded of a precedent regarding the territorial cession in the case of Sobadar of Deccan where the 'hazard of failure in his Highness' territorial resources has no proportion to the dangers which menace the most alarming defalcation in those of your Excellency's territory'.¹ The letter closes with a request to pay a proportion of the money spent on the embassy of Persia to counteract the threatened invasion of Zaman Shah and to agree to one of the alternatives of territorial cession or unqualified abdication in favour of the Company. The Governor-General was adamant in the views which he held about the affairs. His letter² to the Resident dated 28th April, 1801, not only exhibits a critical exposition of the motives which he detailed in his letter to the Nawab but his firm resolve to carry through the second alternative at least at any cost.

The Resident was even authorised to press the matter of the cession of the territories to the Nawab and in case he dissented 'to direct the British troops to march for the purpose of establishing the authority of the British Government within those districts'.³ These protestations of authority at last terminated in the relaxation on the part of Nawab Saadat Ali Khan who was thus obliged to give his assent to the second proposition regarding the territorial cession.

The Nawab, however, was not prepared for an unqualified cession of the proposed territories but wanted to lay down certain terms in conjunction with or preparatory to the actual cession. The terms which he ultimately laid down for the perusal and action of the Governor-General were eighteen in number.⁴ They evidently evinced a distrust in the policy hitherto followed by the

¹ Wellesley's Despatches, Vol II, p. 489

² Despatches, Vol II, p. 503

³ Wellesley's Despatches, Vol II, p. 503

⁴ Letter from the Nawab Wazir to Resident, 3rd Muharram, 1216 A H

Governor-General and aimed at a more reasonable consideration of his condition. At one place in the course of those articles it has been pointed out 'whatever hereditary rights of this state descended to the late Nawab Asafuddaula now devolve upon me his successor, let me enjoy such rights exclusively and let all the inheritances of my ancestors and the whole of the rights attached to my family centre in me, and let no person interfere in or assume them'¹ Then, again, the letter points to the fact that the Nawab Wazir for once wanted to shake off the yoke under which he was struggling and expressed that all the correspondence between the Governor-General and the Nawab's dependents should be carried on with the knowledge of the Nawab. The limits of the ceded territories and the reserved territories should be clearly defined to obviate all chances of any future trouble. Further, that the Company must be responsible for quelling all troubles and disturbances inside the State. What is perhaps more important than the above-mentioned enumeration of the conditions laid down was the question of the relationship of the Resident and the Nawab. The terms of the letter betray the great concern and anxiety which the Nawab Wazir felt with regard to his relations with the Resident, and plead for better relations between himself and the Resident. In the 14th article of the letter of requests he points out, "Let the Resident cordially and with sincerity uniting with me pay no sort of attention to the representations of event-searching, self-interested persons, who are ever on the watch to sow dissensions"² It will be proper to observe that the last request of the Nawab was no less important in view of the emphasis that he later always laid on it. It was that the Nawab should be permitted to go on pilgrimages whenever he liked to do so and that no obstacle was to be placed in his way believing as the Nawab did that 'such excursions will prove the source of amusement to me

¹ Despatches of Wellesley, Vol II, p 528

² Wellesley's Despatches, Vol II, p 529

and I shall recover my wonted state of health, which has of late been on the decline' It is difficult to find out the exact intention of the Nawab in preferring this request which later he did so constantly 'The Resident suggested at the time an idea not unsupported by collateral circumstances, that his Excellency might possibly be projecting a voyage to England with a view (we may presume) of laying his wrongs at the feet of the British Throne and Parliament'¹ The feelings which must have led the Nawab to write such a paper of requests were only natural in view of the fact that he was so much exasperated by Lord Wellesley Any sympathetic consideration of the proposal above enunciated at the hands of Lord Wellesley was out of question He met them with a strong rebuff and explicitly declared in the reply that 'His Lordship has demanded territorial security for the payment of the subsidy due, by the Vizier, to the Company as a matter of right and justice which required no correspondent concession on the part of the Company'² He characterised the articles mentioned there as betraying most unjustifiable and undignified jealousy of the Company's authority, a most callous disregard to the help which the Company was doing to the Nawab The idea of permanency of the present settlement arrived at, which was emphasised by the Nawab, was brushed aside by Lord Wellesley with the remark, 'with regard to the permanency of any settlement to be now concluded with the British Government, the articles already proposed by the Resident are sufficient for that purpose'³

Lord Wellesley bent upon the execution of his schemes soon after on the 15th June, 1801,⁴ apprised the Resident

¹ Hale, Oudh Question Stated and Considered, Chap I, p 34

² Remarks by the Governor-General on Vizier of Oude's Propositions, 2nd June, 1801, Vol II, pp 527—33

³ Remarks by the Governor-General on Vizier of Oude's Propositions, 2nd June, 1801, Vol II, pp 527—33

⁴ Letter from M Wellesley to Lt-Col Scott, June 15, 1801 Vol II, pp 537—39

Lt-Col Scott the urgent need of requiring 'the liquidation of the whole arrear due by his Excellency on account of the augmentation of the army in Oude' threatening to sequester a portion of the Nawab's revenues in case he delayed. He was given full powers in urging the Nawab in prompt payment of arrears, reform of the military administration and in obtaining the territorial security from him. He announced his intention of visiting Oudh early but insisted that this should not form a pretext for any delay or evasion on the part of the Nawab.

Mr Henry Wellesley was later sent by the Governor-General with full powers to make a treaty primarily with a view to preclude all chances of the Nawab in any way delaying the affairs. Henry Wellesley was clearly told, "The general object of your mission is to confirm the representations of Lt-Col Scott by the direct application of my authority"¹ He was, however, fully instructed 'to endeavour to obtain the acquiescence in the terms of the first proposition submitted to his Excellency and Lt-Col Scott,' and only in case of failure was he to insist and obtain his consent to the second proposition regarding territorial cession. All this was clearly a measure to expedite business. The first conference of Nawab Saadat Ali Khan, Henry Wellesley and Lieut Scott took place in the first week of September. It cannot be denied that even at this time the Wazir was feeling nervous about the treaty and tried to reopen the old question² which was not permitted by Henry Wellesley, intent on immediate execution of the plan. The Nawab invariably felt disconcerted about his own position although he was always assured of a very sympathetic attention towards his interests. It is interesting to notice that before the intention

¹ Letter from M Wellesley to H Wellesley, July 5, 1801, Vol II, pp 641—46

² The Hon H Wellesley to M Wellesley, 6th September, 1801, Vol II, pp 667—69

of Nawab Saadat Ali Khan regarding his abdication of civil and military powers in favour of the Company or perpetual cession of his territory was known to Lord Wellesley he sent a despatch to the two negotiators to enforce the first of the two propositions in case the Nawab declined to accept either. The paper, however, arrived too late when Nawab Saadat Ali Khan had already agreed to the second proposition and consented to the perpetual cession of a part of his territory in lieu of the subsidy "Indeed although this paper did not reach the scene of action till after the close of the negotiations the spirit of its contents seems to have arrived there with Mr Wellesley"¹

The long and protracted negotiations were at last brought to a close by the treaty of cession on the 10th November, 1801, at Lucknow² The Governor-General believed that 'the result of this settlement will prove highly beneficial to the general finances of the Company in India and will afford immediate relief to those of Bengal'³ The treaty was finally ratified on November 14, 1801, by the Governor-General⁴

The treaty consisted of the following ten articles

Article 1—Nawab Saadat Ali Khan hereby cedes to the Company in perpetual sovereignty the undermentioned portions of his possessions, amounting in gross revenue to one crore and thirty-five lakhs of rupees, including expenses in commutation of the subsidy, of the expenses attendant on the additional troops and of the Benares and Fairuckabad pensions

¹ Remarks on the Oudh Question, Chapter I, pp 39-40

² The Hon H Wellesley to M Wellesley, Lucknow, November 10, 1801, Despatches, Vol II, pp 596-97

³ M Wellesley to Chairman of Court of Directors, November 13, 1801 Vol II, pp 597-98

⁴ M Wellesley to H Wellesley and Scott, 14th November, 1801, Vol II, pp 598-602

STATEMENT OF THE JUMMA

Chucklah Kerah Kuwah, and Chucklar Etawah	55,48,571-11-9
Rehr and others	5,33,374-0-6
Farruckabad and others	4,50,001-0-0
Khairgarh and others	2,10,001-0-0
Azamgarh and others	6,95,621-7-6
Gorakhpur and others } and Butwal } Butwal	5 09 853-8-0 } 40,001-0 0 }
Subah of Allahabad and others	9,34,963-1-3
Chucklah Bareilly, Asafabad and Kelpoy	43,13 457-11-3
Nawabganj, Rehly and others	1,19,242-12-0
Mohoul and others with the exception of the } Talooka of Arual }	1,68,378-4-0

Total Jumma in Rs 1,35,23,474-8-3

Article 2—The subsidy so far paid by the Nawab shall cease for ever, and the Nawab shall be relieved from the obligation of defraying the expenses of any additional troops 'which at any time may be required for the protection of Oudh and its dependencies'¹

Article 3—The East India Company engages to defend the remaining territories of the Wazir against all domestic and foreign enemies 'provided always that it be in the power of the Company's Government to station the British troops in such parts of his Excellency's dominions as shall appear to the said Government most expedient, and provided further that his Excellency, retaining in his pay four battalions of infantry one battalion of Nujeebs and Mewattis, two thousand horsemen and the number of 300 Goolandauz, shall dismiss the remainder of his troops, excepting such a number of armed peons as shall be deemed necessary for the purpose of collections, and a few horsemen and Nujeebs to attend the persons of the Aumils'²

¹ Wellesley's Despatches, Vol II, p 600

² *Ibid*

Article 4—A detachment of the British troops with a proportion of artillery, shall at all times be attached to his Excellency's person

Article 5—For a true understanding of the above 'it is hereby declared that the territorial cession being in lieu of the subsidy and of all expenses on account of the Company's defensive engagements with his Excellency, no demand whatever shall be made upon the territory of his Excellency on account of expenses which the Honourable Company may incur by assembling forces to repel the attack or menaced attack of a foreign enemy, on account of the detachment attached to his Excellency's person, on account of troops which may occasionally be furnished for suppressing rebellions or disorders in his Excellency's territories, on account of any future change of military station, or on account of failure on the resources of the ceded districts, arising from unfavourable seasons, the calamities of war, or any other cause whatsoever '1

Article 6—The ceded districts shall be exclusively managed by the Company's officials 'and the Hon. the East India Company guarantee hereby to his Excellency the Vizier and to his heirs and successors, the possession of the territories which will remain to his Excellency after the territorial cession, together with the exercise of his and then authority within the said dominions. His Excellency engages that he will establish in his reserved dominions such a system of administration (to be carried on by his own officers) as shall be conducive to the prosperity of his subjects and be calculated to secure the lives and property of the inhabitants, and his Excellency will advise with, and act in conformity to the counsel of the officers of the said Company '2

¹ Wellesley's Despatches, Vol II, p 600

² *Ibid*

Article 7 —The ceded districts shall be given over to the Company's officers from 22nd September, 1801, and till then the Nawab shall pay the subsidy and the expenses of the additional troops and not after

Article 8 —The contracting parties frame a separate commercial treaty Navigation of the Ganges and other rivers forming a mutual boundary shall be free and no duty shall be charged on the boats plying in them.

Article 9 —All treaties regarding establishing or cementing union and friendship between the two States shall remain in force, all articles of the treaty concluded by Sir John Shore in 1798 not annulled by this treaty shall remain in force

Article 10 —The treaty was concluded on the 10th November, 1801

The treaty having been duly ratified the Governor-General instructed the Nawab to expedite the actual cession by the aid of the aumils of the Nawab himself and formally appointed Henry Wellesley as the President of the Commission over the administration of the ceded districts on November 14, 1801¹

It is clear from the perusal of all the foregoing correspondence that the Governor-General from the very beginning wanted to take advantage of the situation for the interests of the Company though also for Oudh

He was at last enabled to realise his longed-for desire of annihilating the entire army and a territorial cession of Doab which he contemplated long before when he coveted the estate of Almass Ali Khan Let us now institute a critical examination of the justice or otherwise of the territorial cession The eleventh article of the treaty of 1798 was pointed out by the Governor-General to be the ultimate

¹ M Wellesley to H Wellesley November 14, 1801 Vol II, pp 604-05

sanction for this territorial cession. According to the fair interpretation of the article of the treaty it must be clear that the security was to be demanded only in case of an actual failure of the payment of the subsidy. The question regarding the failure of the subsidy has been easily dispensed with by the Governor-General when he pointed out that owing to the bad condition of the finances he could expect the failure any moment. This would rather be a very extraordinary presumption in the light of which all arbitrary measures can have sanction. 'Were it true that by an exact adherence to the provisions of the treaty, the British Government would have been exposed to ultimate loss, this would only prove that the treaty was bad one, but what sort of reason would that be for breaking it?'¹ The moment when the proposition for the territorial cession was put forth the subsidy had been regularly paid. It would be preposterous, therefore, to imagine that this course would suddenly stop before a partial arrear should authorise and entitle the Company to press for territorial cession. The condition contemplated by the Governor-General regarding a sudden stopping of the subsidy could only be imagined in case of any great political revolution which would have been morally impossible in view of the British forces there. The suggestion or rather the conviction of Lord Wellesley that the treaty of 1798 contemplated and meant that security could be demanded even when the failure of the subsidy had not occurred cannot be believed in view of the circumstances detailed above.

The second point to be considered is the question regarding the right of interference as the Governor-General claimed to have in the internal affairs of Oudh. Instances can be multiplied showing that this right was never exercised by either Cornwallis or Lord Teignmouth. At one place the former writes to the Wazir, 'that it is not his wish, nor that

¹ Remarks on the Oude Question, p. 47

of the English Government to interfere in the internal arrangement of the Vizier's affairs' In a letter to Bengal Council dated 21st March, 1797, Sir John Shore writes, "Although I have urged advice and remonstrance in strong terms (to the Wazir) I have ever avoided the language of intimidation" Even the resident Lt-Col Scott at one place writes, "The exercise of it (the Resident's interference in the ordinary internal transactions of Government) does not seem to have been intended by the late treaty and is unequivocally disavowed by several declarations"¹

It is, therefore, a surprise as to what was the source from which the Governor-General derived the right which he claimed to possess. It has been urged by the British Government that the Nawab Wazir himself applied for direct interference² in the administration. First of all it has got to be considered whether this invitation on the part of the Nawab Wazir to the Governor-General could be legally regarded as barring the Nawab's right to claim the benefit of that provision of the treaty of 1798 which gave him full authority in the administration of the internal matters. Again, it must be remembered that the letters alluded to were simple epistles communicated to the Governor-General with a view to take his advice, they never show any commitment on the part of the Nawab that he would necessarily follow the advice offered.

If even for the sake of argument it be conceded that the Company possessed the rights which they exercised, was not the Nawab Wazir entitled to the right of moderation which was denied to him? Even if it is conceded that the Company was within its rights to demand territorial cession it must be understood that the security demanded was much in excess of the real requirements. The actual Jumma of the ceded districts while under the Nawab never exceeded one crore and thirty-five lakhs of rupees, under the Company it rose

¹ Oudh Papers, No 3, p 15

² Oudh Papers, No 3, p 9

to one crore and fifty-seven lakhs of rupees. Again, no attempt was ever made to help the Nawab to reform the effete administration which was allowed to suffer. The perpetual territorial cession was apparently based on the utter worthlessness of the Nawab's administration which was permitted to grow worse. It must again be mentioned that the number of the British forces computed by the British Government in 1801 for Oudh was inordinately large but curiously enough when the treaty was made the Governor-General did not station the same number of men there. It was clearly a measure for relieving the finances of the embarrassed Company. Even the excuse of political necessity¹ which Hutton puts in justification of the conduct of Lord Wellesley fails when it is understood that while the proceedings regarding the territorial cession were in progress the menace of Zaman Shah had finally disappeared. He was imprisoned and blinded and thus made absolutely incapable of pursuing any further conquests.

It would be rather ridiculous to see the views held by Najmul Ghami in his *Tarikh-i-Oudh* when he says,

برٹس گورنمنٹ کا دونوں درخواستوں کا کرنا نواب سے نہ اخلاق کے خلاف نہ عدالت سے مخالف . اس ملک میں امن و امان رکھنے کا فرض ایسا گورنمنٹ انگریزی کے دے نہ تھا کہ سرانط ثروت بھی حادثے ہو کچھ حدال نہیں کھانا عرصہ گورنمنٹ کو حوالہ عہد نامہ کے موافق دیکھو حوالہ آئیں ملک داری کے لحاظ سے دیکھو ملک لے لیے کا اسمبلی حاصل دیا²

It is difficult to agree with the extraordinary statement put forward by the author that the Company was justified in breaking all treaties or engagements so long as it looked after the well-being of the kingdom of Oudh.

¹ The Marquis of Wellesley and the development of the Company into the supreme power in India, Hutton

² Najmul Ghami, *Tarikh-i-Oudh*, Vol I, pp 34-35

The debates that subsequently after the resignation of Lord Wellesley took place in the House of Commons bring forth in limehight both the points of view regarding the policy of Lord Wellesley.¹ It has been pointed out that after the territorial cession the Nawab Wazir lived very happily and ever tried to help the English people and never made any complaint. The above view may at best be regarded as a compliment to the temperament of the Nawab and cannot in any way exonerate Lord Wellesley of the injustice. It must, however, be mentioned in all fairness to Lord Wellesley that he cannot be accused of corruption. He did all in the interests of the Company and was above all dirty politics of this type. Yet when all is said it must be conceded 'that Wellesley was extremely impatient of all opposition, that he showed far too little sympathy for his opponent and an utter incapacity to view things through the latter's eyes'.² The only defence of Lord Wellesley can be based on his purity of motives and devotion to duty under his charge. It is in itself a very difficult and doubtful proposition to state that such a defence exonerates Lord Wellesley from all the harsh proceedings against Oudh. They are perhaps too serious to be brushed aside merely by this defence.

V

The Governor-General having been always desirous of visiting Oudh could not do so till the month of January, 1802. Then he took the earliest opportunity of meeting the Nawab Wazir at Lucknow and 'proceeded to state to him the various points arising out of the treaty of the 10th November, 1801, which remained to be adjusted'.³ The main points

¹ Corbett, Parliamentary Debates, March 9, 1808, and March 15, 1808.

² Roberts, Wellesley, p. 135.

³ Minute by the Governor-General, August 16, 1802. Despatches, Vol II, p. 672.

which the Governor-General emphasised were the immediate payment of the arrears in instalments, and the immediate reduction of the military administration in his country. He, however, promised to discuss the question of further improvement in the system of the government obtaining in Oudh. The Wazir seemed very much enthusiastic about the latter. In a subsequent conference, however, the question of reforms was discussed in brief outlines and there the Governor-General emphasised the need of having law courts and an efficient judicial administration with a view to curtail the powers of the aumils who were a source of great mischief to the people. A radical reform in the revenue administration was also suggested by the Governor-General. Here, again, we find that the Nawab Wazir growing sick of the galling yoke of the Resident points out to the Governor-General the necessity of relaxing it.¹ He again pleaded for a cordial cooperation with the Resident. He complained that the fact that all the people had free access to the Resident was subversive of all regularity and tended to undermine his authority. Regarding the administration of justice he pointed out that it should be equally applicable in the Begum's territories. The Governor-General, however, did not agree to the wholesale curtailment of the powers of the Resident who he believed must carry on the affairs of the government having remained duly informed of all the occurrences. The cession being quite complete the Nawab Wazir pointed out to the Hon'ble Henry Wellesley that certain of the property in the ceded districts which did not form a part of the engagement should be given to the Nawab's people and gave an account of other administrative affairs which were agreed to by the Governor General.

The question of the Nawab's going on a pilgrimage was opened to the Governor-General on the 18th February, 1802. Lord Wellesley pointed out the pros and cons of the

¹ Despatches, Vol II, p. 678

matter and satisfied the Wazir of the inexpediency of undertaking such a step at that time. He, however, made it clear that in case the Nawab was convinced of his resolution he was free to go on pilgrimage¹. The Nawab acquiesced in the views expressed by the Governor-General. The question of the payment of the arrears now arose and the Persian Secretary was despatched to the Nawab for payment of the promised sum of eight lakhs by the Nawab. But to his infinite surprise and indignation the Governor-General learnt that the Nawab had resolved to render the payment of that sum dependent on the conclusion of an arrangement for his Excellency's departure on his projected pilgrimage². The Governor-General penned a strong letter to the Nawab Wazir and the reply to the letter is a singular instance of his timidity and weakness of will. He clearly writes, "My desire to conform to his Lordship's wishes induced me to agree to what his Lordship proposed,"³ although in fact he wanted to go on a pilgrimage and that one of his sons be invested with 'naubat' at Lucknow. The letter of the Wazir had the desired effect and the payment was punctually made. The Governor-General, however, agreed to the desire of the Nawab Wazir to go on the pilgrimage and Muza Ahmad Ali Khan, the second son of the Nawab, was appointed the Naib. The Nawab then insisted on the appointment of a confidential minister as the channel of communication between his son and the Resident, providing that the appointment of the confidential minister shall remain in the hands of the Nawab. The last conference between the Nawab and the Governor-General on 24th brought all the matters under consideration. The Nawab Wazir's old propositions were agreed to in substance in the last conference of the 24th February.

¹ Minute by Governor-General, August 16, 1802, p. 683.

² Letter to Nawab Wazir, 20th February, 1802, Vol. II, pp. 685-87.

³ Letter from Nawab Wazir to Persian Secretary, 20th February, 1802, Vol. II, p. 687.

The most important result of the series of the conferences which were held at Lucknow between the Nawab Wazir and the Governor-General was the drafting of a paper or memorandum of the final results of the discussions between the Governor-General and Nawab Saadat Ali Khan 'with a view to obviate all future doubts on the subject' ¹ The Governor-General gave out the general principles on which the connections between the two States were to be regulated in future. He made it clear that the reserved dominions of the Nawab shall be exclusively administered by his Excellency's own officers although the Nawab shall always work in consultation with the Governor-General. The Resident, further, shall normally offer the advice though when 'the importance of the subject shall require' the Governor-General shall do it directly. Further, in defining the powers of the Resident it was pointed out that the Resident must conduct himself with the Nawab Wazir with respect, conciliation and attention. The reduction of the military establishment was soon after nearly accomplished. Lord Wellesley, however, due to 'pressure of other urgent business' ² could not discuss the matters relating to the Nawab and the Begum.

The subsequent period till Wellesley's resignation is rather uneventful. The chief interest now centres round the Mahratta affairs. During this time Major Ouseley was appointed Aide-de-Camp to the Nawab Wazir in consequence of the strong recommendation of Sir Henry Wellesley. 'In that situation Sir Gore Ouseley availed himself with judgment and wisdom of every opportunity to cultivate a good understanding between the State of Oudh and the British power, whose interests in fact are inseparable' ³ At the commencement of the Mahratta War in 1803 the Nawab helped the

¹ Wellesley's Despatches, Vol II, p 691

² Wellesley's Despatches, Vol, II, p 695

³ Memorandum of the Public Services of Sir Gore Ouseley, Appendix 5, Despatches, Vol IV, p 679

Company with a number of horses. This magnificent offer was very much appreciated by Lord Lake who employed them in the memorable battle of Laswatee and in the pursuit and defeat of Holkar.

Hunting and sports seems to be the chief pre-occupations of the Nawab Wazir during the period. We find references to his requisitions regarding dogs and horses from England. At one place Lord Wellesley writes to the Hon'ble Court of Directors, 'I understand that His Highness (Nawab) whose principal amusement consists in hunting is particularly anxious to obtain from England a number of dogs and horses'¹. His wishes were complied with. Sir Gore Ouseley the Aide-de-Camp was in full confidence of the Nawab Wazir and was a regular companion in his sports and amusements. Nawab Saadat Ali Khan seems to be specially very fond of English manners and customs and with a surprise does Lord Valentia on his visit to Oudh mark the English influence. 'The scene (dinner scene) was so singular and so contrary to all my ideas of Asiatic manners, that I could hardly persuade myself that the whole was not a masquerade'². Even Lord Valentia in his short stay at Lucknow could easily feel the malign influence of Europeans over the Nawab. "The lowest European gentleman seems to consider himself as on equality with his Highness, and does not always treat him with respect which is his due"³. This was the observation of the noble traveller when all the ugly proceedings against the Nawab by Lord Wellesley had been completed. Lord Valentia then gives an account of the proceedings taken by Lord Wellesley against Oudh and the Nawab's wish to abdicate. He, however, means to suggest that after the storm and stress of the proceedings witnessed a few years back, the Nawab then enjoyed peace and harmony in his own kingdom. 'At present he

¹ Wellesley's Despatches, Vol V, p 493

² Travels of Lord Valentia, p 133

³ *Ibid*, p 134

seems to be more tranquil. The disaffection he might have experienced at the cession of a moiety of his territory, is absorbed in the discovery, that he has more real revenue, and can add more to his treasure than he did when he paid the East India Company one hundred and twenty lakhs of rupees per annum¹. He then testifies to the prosperity of the country ceded to the Company and concludes that the Nawab Wazir was in a much better position at the time of Lord Valentia's visit when he was already divested of a part of his territory, than before the territorial cession took place. But it must be remembered that it is not creditable for the Company to have lightened the burden of his administration in the manner they did, it would certainly have been a great service to the country and the people, had the Company decided to promote prosperity by its help and patronage in the affairs of Oudh. It is no wonder that, with the parsimonious habits of Nawab Saadat Ali Khan, he had collected a huge treasure by the time of Lord Valentia's arrival to Oudh. But the prosperity of the country and its ruler after the actual cession of the territory can hardly be construed as a justification for all the proceedings of Lord Wellesley.

¹ Travels of Lord Valentia, p. 130

SECTION III

LAW

THE MUSLIM LAW OF INHERITANCE

BY

DR. MAHOMED-ULLAH S. JUNG, M.A., LL.D.

Barister-at-Law, Reader in Law

'Ilm ul Faraz the Muslim Law of Inheritance is a great achievement of the Muslim Jurists. In its minutest details it is a system rendered to perfection. It is, as Rumsey observes, "the most refined and elaborate system of rules for the devolution of property that is known to the civilized world."

Under the Hanafi Law the heirs are divided in three distinct groups, and some other classes of "special heirs" follow next in order:

- 1 Zav-ul-furuz, the shareis
- 2 'Asba, the residuaries
- 3 Zav-ul-Arham, the Distant Kindred

Other classes are

- 4 Mawlâ-i-Mawalât, the successor by contract
- 5 Muqirru bilnasab alghau, the acknowledged kinsman through another
- 6 Musfilhu bil Jamu'âl, the universal legatee
- 7 Radd alal Zaujain, the return to the husband or wife

8 Bait-ul-mal, the Public Treasury, now the Law of Escheats to the State

There are twelve shareis, four males and eight females, and there are four classes of residuaries, and there are four groups of distant kindred. The general order of succession is that the shareis and residuaries may succeed jointly or the shareis alone may succeed exhausting the estate or taking by *add*, the return, in the absence of the residuaries, or the residuaries alone may succeed there being no conversion of shareis into residuaries or even by excluding remoter shareis. In default of shareis and the residuaries the estate devolves upon the distant kindred. In default of all possible kind of heirs it escheats to the State.

There are twelve shareis and with residuaries the total list would be roughly twenty to twenty-five important heirs taking no account of the distant kindred.

If a person makes an attempt to arrange their combinations in twos, threes, fours and fives, etc., he would have to work out at least a million illustrations, a task almost impracticable, if not impossible. However, following the general rules of exclusion and preference as laid down by the Muslim Jurists it is possible to reduce them to about 326 cases, and I have made an attempt to arrange these cases in a systematic manner. So we have in short a compendium of general illustrations in which almost all conceivable cases, except those in which the heirs are excluded, are found with great facility. All what the reader has to do is to arrange the heirs in the fixed order as per list of heirs—and for any combination of heirs with that particular heir he must see in cases dealing with that particular heir. Strictly speaking it is not possible to have a combination of more than five different classes of heirs, for the law of exclusion eliminates the rest though they may be in existence.

THE LIST OF HEIRS

The following is the proposed fixed order of heirs, of the sharers and the residuaries only

- 1 Son
- 2 Daughter, daughters
- 3 Son's son, how low so ever
- 4 Son's daughter, son's daughters
- 5 Husband
- 6 Wife, wives
- 7 Father
- 8 Mother
- 9 True grandmother, true grandmothers
- 10 True grandfather
- 11 Full brother
- 12 Full sister
- 13 Consanguine brother
- 14 Consanguine sister, consanguine sisters
- 15 Uterine brother or sister or uterine brothers or sisters
- 16 Full brother's son, nephew
- 17 Consanguine brother's son, consanguine nephew
- 18 Full paternal uncle, Father's full brother
- 19 Consanguine paternal uncle, father's consanguine brother
- 20 Full paternal uncle's son
- 21 Consanguine paternal uncle's son
- 22 Great-uncle, Father's father's brother
- 23 Consanguine great uncle, Father's father's consanguine brother
- 24 Great-uncle's son
- 25 Consanguine great-uncle's son ¹

¹ The distant kindred classes I, II, III, and IV will follow next in order, and subsequently other heirs, the successor by contract, acknowledged kinsman, universal legatee and the State

I have dealt with the case of the son (a) when with one heir, (b) when with two heirs, and (c) when with three heirs, and (d) when with four heirs the latter is really identical with the third case unless we classify daughter as a separate heir and not as a residuary along with the son. Similarly the cases of other heirs up to uterine brother and sister have been treated with one or more heirs. The list of twenty-five heirs is given on page 9, and the reader will see that when the son is the only heir, he will take the whole property, and when he co-exists with all the twenty-five heirs the position will be briefly this. The son will exclude all the heirs, *viz*, Nos 3 and 4 and all the heirs from Nos 11 to 25. The father and mother will exclude the heirs Nos 9 and 10. As regards heirs Nos 5 and 6 husband and wife, only one of them can participate at one and the same time. Thus after exclusion the following heirs only are left over to participate in the inheritance

- 1 Son along with daughter or daughters
- 2 Husband or wife as the case may be
- 3 Father
- 4 Mother

Thus the maximum number of heirs that can participate with the son in taking the inheritance are three (or four) only. Similarly it will be seen that the maximum number of heirs that can participate along with the daughter or daughters are four only, or utmost five *vide* illustration 79 where we may include son's daughter along with son's son and No 84 where we may include son's son's daughter along with son's son's son as residuaries and the number of heirs nominally may increase more to 6, 7, etc., by including son's son's son (h l s) of a lower degree along with son's son's daughters of higher degrees.

GENERAL ILLUSTRATIONS

When any of the heirs Nos 1—25 exist alone he or she will take the whole property

No	Heirs	Shares	No	Heirs	Shares
	<i>Illustrations of son or sons together with one heir *</i>			<i>Illustrations of son or sons together with two heirs †</i>	
1	Son	$\frac{2}{3}$	5	Son	$\frac{1}{2}$ of $\frac{2}{3} = \frac{1}{3}$
	Daughter	$\frac{1}{3}$		Daughter	$\frac{1}{2}$ of $\frac{2}{3} = \frac{1}{3}$
2	Son or sons	$\frac{1}{2}$ (R) ‡		Wife or wives	$\frac{1}{2} = \frac{1}{2}$
	Husband	$\frac{1}{2}$	6	Son	$\frac{2}{3}$ of $\frac{5}{6} = \frac{10}{9}$
3	Son or sons	$\frac{2}{3}$ (R)		Daughter	$\frac{1}{3}$ of $\frac{5}{6} = \frac{5}{18}$
	Wife or wives	$\frac{1}{3}$		Father or mother or true grandmother or true grandfather	$\frac{1}{6} = \frac{1}{6}$
4	Son or sons	$\frac{4}{5}$ (R)	7	Sons and daughters	$\frac{2}{3}$ (R)
	Father or mother or true grandmother or true grandfather	$\frac{1}{5}$		Wife or wives	$\frac{1}{3}$

* The son will inherit out of the residue estate in these cases but in other cases of combination of any heir with the son the former will be excluded *vide* the General Chart at the end of the book

(a) Son = all

Son's son or son's daughter = excluded by the son

(b) Son = all

Full brother = excluded by the son

‡ 1 (R) = Residue

‡ Besides these no other combination of the son with two heirs is possible for the heir will be excluded from participating in the inheritance, *viz* —

(a) Son = $\frac{5}{6}$

Father = $\frac{1}{6}$

Brother = excluded

(b) Son = $\frac{2}{3}$

Daughter = $\frac{1}{3}$

Full sister = excluded

No	Heirs	Shares	No	Heirs	Shares
8	Sons and daughters	$\frac{5}{6}$ (R)	13	Son or sons	$\frac{7}{8} = \frac{4}{4}$
	Father or mother or true grandmother or true grandfather	$\frac{1}{6}$		Father or true grandfather	$\frac{1}{8}$
				Mother or true grandmother	$\frac{1}{8}$
9	Son or sons and daughter or daughters	$\frac{3}{4}$ (R)	14	Son or sons	$\frac{5}{6} = \frac{5}{6}$
	Husband	$\frac{1}{4}$		True grandmothers (maternal grandmother, paternal grandmother)	$\frac{1}{6}$
10	Son	$\frac{2}{3}$ of $\frac{3}{4} = \frac{1}{2}$	15	Son or sons	$\frac{2}{3} = \frac{4}{6}$
	Daughter	$\frac{1}{3}$ of $\frac{3}{4} = \frac{1}{4}$		True grandmother (maternal)	$\frac{1}{6}$
	Husband	$\frac{1}{4} = \frac{2}{8}$		True grandfather	$\frac{1}{6}$
11	Son or sons	$\frac{7}{8}$ (R)		<i>Illustrations of son or sons together with three heirs*</i>	
	Husband	$\frac{1}{8} = \frac{1}{8}$			
	Father or mother or true grandmother or true grandfather	$\frac{1}{8} = \frac{1}{8}$	16	Son or sons and daughter or daughters	$\frac{7}{8}$ (R)
12	Son or sons	$\frac{3}{4}$ (R)		Husband	$\frac{1}{8} = \frac{1}{8}$
	Wife or wives	$\frac{1}{8} = \frac{1}{8}$		Father or mother or true grandmother or true grandfather	$\frac{1}{8} = \frac{1}{8}$
	Father or mother or true grandmother or grandfather	$\frac{1}{8} = \frac{1}{8}$			

*In cases 16-20 the son and daughter for purposes of convenience have been grouped together they are similar to cases Nos 11-15 and in cases 20-25 the inclusion of daughter would make the case of the son with four heirs and these are the only cases of the son with four heirs. The distribution will remain unaffected, for instance in example 21 the daughter will share along with the son out of the residue $\frac{5}{12}$ the son taking twice as much as the daughter. Similarly in examples 22-25 the daughter or daughters will share with the son or sons in the residue.

No	Heirs	Shares	No	Heirs	Shares
17	Son or sons and daughter or daughters	$\frac{17}{24}$ (R)	21	Son or sons	$\frac{5}{12}$ (R)
	Wife or wives	$\frac{1}{4} = \frac{3}{12}$		Husband	$\frac{1}{4} = \frac{3}{12}$
	Father or mother or true grandmother or true grandfather	$\frac{1}{6} = \frac{2}{12}$		Father or true grandfather	$\frac{1}{6} = \frac{2}{12}$
				Mother or true grandmother (maternal)	$\frac{1}{6} = \frac{2}{12}$
18	Son or sons and daughter or daughters	$\frac{7}{8}$	22	Son or sons	$\frac{7}{12}$ (R)
	Father or true grandfather	$\frac{1}{6}$		Husband	$\frac{1}{4} = \frac{3}{12}$
	Mother or true grandmother (maternal)	$\frac{1}{6}$		True grandmothers (maternal and paternal)	$\frac{1}{6} = \frac{2}{12}$
19	Son or sons and daughter or daughters	$\frac{5}{7}$	23	Son or sons	$\frac{5}{12}$ (R)
	True grandmothers (maternal and paternal)	$\frac{1}{6}$		Husband	$\frac{1}{4} = \frac{3}{12}$
				True grandmother or true grandmothers	$\frac{1}{6} = \frac{2}{12}$
				True grandfather	$\frac{1}{6} = \frac{2}{12}$
20	Son or sons and daughter or daughters	$\frac{3}{4}$	24	Son or sons	$\frac{13}{24}$ (R)
	True grandfather	$\frac{1}{6}$		Wife or wives	$\frac{1}{6} = \frac{4}{24}$
	True grandmother (paternal)	$\frac{1}{6}$		Father or true grandfather	$\frac{1}{6} = \frac{4}{24}$
				Mother or true grandmother (maternal)	$\frac{1}{6} = \frac{4}{24}$
			25	Son or sons	$\frac{13}{24}$
				Wife or wives	$\frac{1}{6} = \frac{4}{24}$
				Grandmother	$\frac{1}{6} = \frac{4}{24}$
				Grandfather	$\frac{1}{6} = \frac{4}{24}$

No	Heirs	Shares	No	Heirs	Shares
	<i>Illustrations of daughter together with one heir</i>			<i>Illustrations of daughter together with two heirs</i>	
26	Daughter	$\frac{1}{2}$	32	Daughter	$\frac{1}{2} = \frac{8}{16}$
	Son's son h l s	$\frac{1}{2}$ (R)		Son's son	$\frac{7}{8}$ of (R) $\frac{1}{2} = \frac{8}{16}$
27	Daughter	$\frac{3}{4} = (\frac{1}{2} + \frac{1}{4})$ by return		Son's daughter	$\frac{3}{4}$ of (R) $\frac{1}{2} = \frac{8}{16}$
	Son's daughter or son's daughters, h l s	$\frac{1}{4} = \frac{1}{8} + \frac{1}{8}$	33	Daughter	$\frac{1}{2} = \frac{8}{16}$
28	Daughter	$\frac{3}{4} = (\frac{1}{2} + \frac{1}{4})$ by return		Husband	$\frac{1}{4}$
29	Husband	$\frac{1}{4}$		Son's son or son's son's son h l s	$\frac{1}{4}$ (R)
	Daughter	$\frac{1}{4} = (\frac{1}{2} + \frac{1}{4})$ by return	34	Daughter	$\frac{1}{2} = \frac{8}{16}$
	Wife or wives	$\frac{1}{8}$		Wife or wives	$\frac{1}{8}$
30	Daughter ($\frac{1}{2}$)	$\frac{3}{4} = (\frac{1}{2} + \frac{1}{4})$ by return		Son's son or Son's son's son h l s	$\frac{3}{8}$ (R)
	Mother or true grandmother ($\frac{1}{8}$)	$\frac{1}{8} = (\frac{1}{8} + \frac{1}{8})$ by return	35	Daughter	$\frac{1}{2} = \frac{8}{16}$
31	Daughter ¹	$\frac{1}{2}$		Father or true grandfather	$\frac{1}{8}$
	Father or true grandfather or full sister or sisters or consanguine sister or sisters or full brother or consanguine brother or any residuary Nos 16—25	$\frac{1}{2}$ (R)		Son's son or son's son's son h l s	$\frac{2}{8}$ (R)
			36	Daughter	$\frac{1}{2} = \frac{8}{16}$
				Mother or true grandmother	$\frac{1}{8}$
				Son's son or son's son h l s	$\frac{2}{8}$ (R)

¹ We have already noted the case of the daughter with the son, and there are no other cases except the case of daughter with uterine brother or sister, where the latter is excluded

Daughter = All ($\frac{1}{2}$ as share and $\frac{1}{4}$ by return)

Uterine brother or sister = excluded

No	Heirs	Shares	No	Heirs	Shares
37	Daughter	$\frac{1}{2} = \frac{2}{4}$	41	Daughter ($\frac{1}{2}$)	$\frac{2}{3}$ increased to $\frac{2}{3}$
	Son's daughter or daughters	$\frac{1}{4}$		Son's daughter or daughters hls ($\frac{1}{8}$)	$\frac{1}{8}$ increased to $\frac{1}{4}$
	Son's son or sons	$\frac{2}{3}$ (R)		Mother or true grandmother (maternal or paternal) ($\frac{1}{8}$)	$\frac{1}{8}$ increased to $\frac{1}{4}$
38	Daughter ($\frac{1}{2}$)	$\frac{1}{2}$ of $\frac{2}{3}$ (R) = $\frac{1}{3}$	42	Daughter or son's daughter	$\frac{1}{2} = \frac{2}{4}$
	Son's daughter or daughters ($\frac{1}{4}$)	$\frac{1}{2}$ of $\frac{1}{3}$ (R) = $\frac{1}{6}$		Son's son's son	$\frac{1}{2}$ of $\frac{1}{3}$ (R) = $\frac{1}{6}$
	Husband*	$\frac{1}{2}$		Son's son's daughter ¹	$\frac{1}{2}$ of $\frac{1}{3}$ (R) = $\frac{1}{6}$
39	Daughter ($\frac{1}{2}$)	$\frac{1}{2}$ of $\frac{1}{3}$ (R) = $\frac{1}{6}$	43	Daughter or son's daughter hls	$\frac{1}{2} = \frac{2}{4}$
	Son's daughter or daughters ($\frac{1}{8}$)	$\frac{1}{2}$ of $\frac{1}{6}$ (R) = $\frac{1}{12}$		Husband	$\frac{1}{2}$
	Wife* ..	$\frac{1}{2} = \frac{4}{8}$		Father or true grandfather or full or consanguine sister or sisters	$\frac{1}{2}$
40	Daughter	$\frac{1}{2} = \frac{2}{4}$	44	Daughter or son's daughter hls ($\frac{1}{2}$) ²	$\frac{1}{2}$ of $\frac{2}{3}$ (R) = $\frac{1}{3}$
	Son's daughter or daughters hls	$\frac{1}{4}$		Mother or true Grandmother (maternal or paternal) ($\frac{1}{8}$)	$\frac{1}{2}$ of $\frac{1}{3}$ (R) = $\frac{1}{6}$
	Father or true grandfather or full or consanguine sister or sisters or full brother or consanguine brother or any residuary Nos 16—25	$\frac{2}{3}$ (R)		Husband	$\frac{1}{2} = \frac{4}{8}$

* The easier method of solving Nos. 38 and 39 is to first assign share to the husband or wife, then distribute the residue between the daughter and the son's daughter in the ratio of their originally fixed share $\frac{1}{2}$ and $\frac{1}{4}$, the ratio is 2:1 or $\frac{2}{3}$ and $\frac{1}{3}$.

¹ If there were more than one, viz., son's son's sons and son's son's daughters the residue ($\frac{1}{2}$) would be distributed among them, the male taking the double share.

² In problems Nos. 44 and 45 we first assign shares to the husband or wife

No	Heirs	Shares	No	Heirs	Shares
45	Daughter or son's daughter hls ($\frac{1}{2}$)	$\frac{1}{2}$ of $\frac{1}{2}$ (R) $=\frac{1}{4}$	48	Daughter or son's daughter	$\frac{1}{2}=\frac{2}{4}$
	Mother or true grandmother (maternal) ($\frac{1}{8}$)	$\frac{1}{8}$ of $\frac{1}{2}$ (R) $=\frac{1}{16}$		Mother or true grandmother (maternal or paternal)	$\frac{1}{8}$
	Wife or wives	$\frac{1}{8}=\frac{2}{16}$		True grandfather or full or consanguine sister or sisters or full or consanguine brother or any residuary Nos 16—25	$\frac{2}{8}$ (R)
46	Daughter or son's daughter or son's son's daughter ²	$\frac{1}{8}=\frac{2}{16}$			
	Wife or wives	$\frac{1}{16}$			
	Father or true grandfather or full or consanguine sister or sisters or full or consanguine brother or any residuary Nos 16—25	$\frac{3}{8}$ (R)		<i>Illustrations of daughter together with three heirs</i>	
			49	Daughter	$\frac{1}{2}=\frac{4}{8}$
				Son's son	$\frac{1}{3}$ of $\frac{1}{2}$ (R) $=\frac{2}{12}$
				Son's daughter	$\frac{1}{3}$ of $\frac{1}{2}$ (R) $=\frac{2}{12}$
47	Daughter or son's daughter or son's son's daughter	$\frac{1}{2}=\frac{2}{4}$		Husband	$\frac{1}{4}=\frac{2}{8}$
	Mother or true grandmother (maternal)	$\frac{1}{8}$	50	Daughter	$\frac{1}{2}=\frac{2}{4}$
	Father	$\frac{2}{8}$ (R)		Son's son or son's son's son's daughter or son's daughters	$\frac{1}{4}$ (R)
				Husband	$\frac{1}{4}$

thereafter we distribute the residue between the daughter and the mother in the ratio of their shares $\frac{1}{2}$ and $\frac{1}{8}$, i.e., 2 : 1 or $\frac{2}{3}$: $\frac{1}{3}$

No	Heirs	Shares	No	Heirs	Shares
51	Daughter Son's son ¹ or son's son's son's daughter or son's daughters }	$\frac{1}{2} = \frac{4}{8}$ $\frac{3}{8}$ (R)	56	Daughter Son's son ² hls Wife or wives	$\frac{1}{2} = \frac{12}{24}$ $\frac{5}{24}$ (R) $\frac{1}{2} = \frac{12}{24}$
52	Wife or wives Daughter Son's son Son's daughter Wife or wives	$\frac{1}{2} = \frac{4}{8}$ $\frac{1}{4}$ of $\frac{8}{8}$ (R) $\frac{1}{4}$ of $\frac{1}{4}$ (R) $= \frac{1}{16}$		Father or true grandfather or mother or true grandmother	$\frac{1}{8} = \frac{4}{32}$
53	Daughter Son's son's son's daughter Father or grandfather or mother or true grandmother	$\frac{1}{2} = \frac{8}{16}$ $\frac{2}{8}$ (R) $\frac{1}{8}$	57	Daughter Son's son ² hls Father or true grandfather Mother or true grandmother (maternal)	$\frac{1}{2} = \frac{3}{6}$ $\frac{1}{8}$ (R) $\frac{1}{8}$ $\frac{1}{8}$
54	Daughter Son's daughter ^o Son's son's son ^o Son's son's daughter ² }	$\frac{1}{2} = \frac{3}{6}$ $\frac{1}{6}$ $\frac{2}{8}$ (R)	58	Daughter Son's daughter's Son's son's son ²	$\frac{1}{2} = \frac{6}{12}$ $\frac{1}{8} = \frac{2}{16}$ $\frac{1}{12}$ (R)
55	Daughter Son's son ^o hls Husband Father or true grandfather or mother or true grandmother	$\frac{1}{2} = \frac{6}{12}$ $\frac{1}{12}$ (R) $\frac{1}{2} = \frac{9}{18}$ $\frac{1}{8} = \frac{2}{16}$	59	Daughter Son's daughter ^o Son's son's son Wife or wives	$\frac{1}{2} = \frac{12}{24}$ $\frac{1}{8} = \frac{4}{32}$ $\frac{5}{24}$ (R) $\frac{1}{8} = \frac{3}{24}$

¹ The result will be the same in the case of son's son's son hls or son's son's daughter

² Whether one or more

No	Heirs	Shares	No	Heirs	Shares
60	Daughter	$\frac{1}{2} - \frac{2}{8}$	64	Daughter	$\frac{1}{2} = \frac{6}{12}$
	Son's daughter	$\frac{1}{8}$		Son's daughter or son's daughters	$\frac{1}{8} = \frac{2}{12}$
	Son's son's son	$\frac{1}{8} (R)$		Husband	$\frac{1}{2} = \frac{6}{12}$
	Father or true grandfather or true grand- mother (maternal or paternal)	$\frac{1}{8}$		Full or consanguine sister or sisters	$\frac{1}{12} (R)$
61	Daughter	$\frac{1}{2} = \frac{6}{12}$	65	Daughter	$\frac{1}{2} = \frac{6}{12}$
	Husband	$\frac{1}{2} = \frac{6}{12}$		Son's daughter or son's daughters	$\frac{1}{8} = \frac{2}{12}$
	Son's son's son	$\frac{1}{2}$ of $\frac{1}{2} (R)$ $= \frac{2}{12}$		Husband	$\frac{1}{2} = \frac{6}{12}$
	Son's son's daughter	$\frac{1}{2}$ of $\frac{1}{2}$ (R) $= \frac{2}{12}$		Full or consanguine brother or any residuary Nos 16-25	$\frac{1}{12} (R)$
62	Daughter	$\frac{1}{2} = \frac{6}{12}$	66	Daughter	$\frac{1}{2} = \frac{6}{12}$
	Husband	$\frac{1}{2}$		Son's daughter or son's daughters	$\frac{1}{8} = \frac{2}{12}$
	Son's sons } sons } Son's son's } daughters }	$\frac{1}{2} (R)$		Wife or wives	$\frac{1}{2} = \frac{6}{12}$
				Father or true grandfather	$\frac{1}{24} (R)$
63	Daughter	$\frac{1}{2} = \frac{6}{12}$ reduced to $\frac{6}{12}$	67	Daughter	$\frac{1}{2} = \frac{6}{12}$
	Son's daughter	$\frac{1}{8} = \frac{2}{12}$ reduced to $\frac{2}{12}$		Son's daughter or son's daughters	$\frac{1}{8} = \frac{2}{12}$
	Husband	$\frac{1}{2} = \frac{6}{12}$ reduced to $\frac{6}{12}$		Wife or wives	$\frac{1}{8} = \frac{2}{12}$
	Father or true grandfather or mother or true grand mother (maternal or paternal)	$\frac{1}{8} = \frac{2}{12}$ reduced to $\frac{2}{12}$		Full or consanguine sister or sisters or full brother or consanguine brother or any residuary Nos 16-25	$\frac{1}{24} (R)$

No	Heirs	Shares	No	Heirs	Shares
68	Daughter (1) ¹	$\frac{2}{3}$ of $\frac{1}{2}$ (R) $=\frac{1}{3}$	71	Daughter	$\frac{1}{2}=\frac{6}{12}$ reduced to $\frac{3}{8}$
	Son's daughter $\frac{1}{6}$	$\frac{1}{3}$ of $\frac{1}{2}$ (R) $=\frac{1}{6}$		Husband	$\frac{1}{4}=\frac{3}{12}$ reduced to $\frac{1}{8}$
	Mother or true grandmother $\frac{1}{6}$	$\frac{1}{3}$ of $\frac{1}{2}$ (R) $=\frac{1}{6}$		Father	$\frac{1}{4}=\frac{3}{12}$ reduced to $\frac{1}{8}$
	Wife or wives	$\frac{1}{8}=\frac{1}{10}$		Mother or true grandmother	$\frac{1}{8}=\frac{1}{12}$ reduced to $\frac{1}{24}$
69	Daughter	$\frac{1}{2}=\frac{3}{6}$	72	Daughter	$\frac{1}{2}=\frac{9}{18}$ reduced to $\frac{1}{3}$
	Son's daughter or son's daughters	$\frac{1}{6}$		Husband	$\frac{1}{4}=\frac{6}{24}$ reduced to $\frac{1}{12}$
	Father or true grandfather	$\frac{1}{3}$		True grandfather	$\frac{1}{6}=\frac{2}{12}$ reduced to $\frac{1}{12}$
70	Mother or true grandmother (maternal)	$\frac{1}{6}$		Mother or true grandmother (maternal or paternal)	$\frac{1}{6}=\frac{2}{12}$ reduced to $\frac{1}{12}$
	Daughter	$\frac{1}{2}=\frac{9}{18}$	73	Daughter	$\frac{1}{2}=\frac{9}{18}$
	Son's daughter or son's daughters	$\frac{1}{6}$		Husband	$\frac{1}{4}=\frac{3}{12}$
	Mother or true grandmother (maternal or paternal)	$\frac{1}{6}$		Mother or true grandmother (maternal or paternal)	$\frac{1}{6}=\frac{2}{12}$
	Full or consanguine sister or sisters or full brother or consanguine brother or any residuary Nos 16—25	$\frac{1}{6}$ (R)		Full or consanguine sister or sisters or full brother or consanguine brother or any residuary Nos 16—25	$\frac{1}{12}$ (R)

¹ Here we first assign the share to the wife then we distribute the inheritance among the first three heirs in the ratio of their shares, $\frac{1}{2}$, $\frac{1}{6}$, $\frac{1}{6}$ i.e., $\frac{1}{2}$: $\frac{1}{6}$: $\frac{1}{6}$ or $\frac{3}{6}$: $\frac{1}{6}$ and $\frac{1}{6}$

No	Heirs	Shares	No	Heirs	Shares
	<i>Illustrations of daughter together with four heirs *</i>		76	Daughter	$\frac{1}{2} = \frac{2}{4}$
				Son's son and } son's daughter }	$\frac{1}{8}$
74	Daughter	$\frac{1}{2} = \frac{2}{4}$		Father or true grandfather	$\frac{1}{8}$
	Son's son and } son's daughter }	$\frac{1}{12} (R)$		Mother or true grandmother	$\frac{1}{8}$
	Husband	$\frac{1}{4} = \frac{2}{8}$	77	Daughter	$\frac{1}{2} = \frac{2}{4}$
	Father or true grandfather or mother or true grandmother (maternal or paternal)	$\frac{1}{8} = \frac{2}{16}$		Son's son and } son's daughter }	$\frac{1}{8}$
				True grandfather	$\frac{1}{8}$
				True grandmother	$\frac{1}{8}$
75	Daughter	$\frac{1}{2} = \frac{2}{4}$	78	Daughter	$\frac{1}{2} = \frac{2}{4}$
	Son's son and } son's daughter }	$\frac{1}{12} (R)$		Son's son	$\frac{1}{24} (R)$
	Wife or wives	$\frac{1}{8} = \frac{2}{16}$		Wife or wives	$\frac{1}{8} = \frac{2}{16}$
	Father or true grandfather or mother or true grandmother (maternal or paternal)	$\frac{1}{8} = \frac{2}{16}$		Father or true grandfather	$\frac{1}{8} = \frac{2}{16}$
				Mother or true grandmother (maternal)	$\frac{1}{8} = \frac{2}{16}$

* Son's son one or more with son's daughter one or more take as residuaries the son's son taking the double share, viz in example 74

Son's son = $2/3$ of $1/12 = 2/36$

Son's daughter = $1/3$ of $1/12 = 1/36$

Since son's son and son's daughter are grouped together as residuaries illustrations Nos 74-77 are really cases of the daughter with three heirs only

No	Heirs	Shares	No	Heirs	Shares
79	Daughter	$\frac{1}{2} = \frac{1}{2}$	83	Daughter	$\frac{1}{2} = \frac{1}{2}$
	Son's son ¹	$\frac{1}{2}$ (R)		Son's daughter	$\frac{1}{2}$
	Wife or wives	$\frac{1}{2} = \frac{1}{2}$		Son's son's son Son's son's daughter	$\frac{1}{2}$ (R)
	True grandfather	$\frac{1}{2} = \frac{1}{2}$		Father or true grandfather or mother or true grandmother (maternal or paternal)	$\frac{1}{2}$
	True grand- mother (mater- nal or paternal)	$\frac{1}{2} = \frac{1}{2}$			
80	Daughter	$\frac{1}{2} = \frac{1}{2}$	84	Daughter ²	$\frac{1}{2} = \frac{1}{2}$
	Son's daughter	$\frac{1}{2} = \frac{1}{2}$		Son's daughter	$\frac{1}{2} = \frac{1}{2}$
	Son's son's son Son's son's daughter	$\frac{1}{2}$ (R)		Son's son's son	$\frac{1}{2}$ (R)
	Husband	$\frac{1}{2} = \frac{1}{2}$		Wife or wives	$\frac{1}{2} = \frac{1}{2}$
81	Daughter	$\frac{1}{2} = \frac{1}{2}$		Father or true grandfather or mother or true grandmother (maternal or paternal)	$\frac{1}{2} = \frac{1}{2}$
	Son's daughter	$\frac{1}{2} = \frac{1}{2}$			
	Son's son's son Son's son's daughter	$\frac{1}{2}$ (R)			
	Wife or wives	$\frac{1}{2} = \frac{1}{2}$	85	Daughter	$\frac{1}{2} = \frac{1}{2}$
82	Daughter	$\frac{1}{2} = \frac{1}{2}$		Son's daughter Son's son	$\frac{1}{2}$ (R)
	Son's son Son's daughter	$\frac{1}{2}$ (R)		Father or true grandfather	$\frac{1}{2}$
	True grandfather	$\frac{1}{2}$		Mother or true grandmother (maternal)	$\frac{1}{2}$
	True grandmother	$\frac{1}{2}$			

¹ With son's daughter it will become a case of five heirs

² This can be converted into a case of five heirs by including Son's son's daughter along with the son's son's son as residuaries and the number of heirs may be further increased if we include son's son's daughters of higher degrees along with son's son's son's sons of a lower degree

No	Heirs	Shares	No	Heirs	Shares
86	Daughter	$\frac{1}{2} = \frac{3}{6}$	89	Daughter	$\frac{1}{2} = \frac{3}{6}$ reduced to $\frac{1}{27}$
	Son's daughter	$\frac{1}{6}$ (R)		Son's daughter	$\frac{1}{6} = \frac{4}{24}$ reduced to $\frac{1}{27}$
	Son's son			Wife or wives	$\frac{1}{6} = \frac{4}{24}$ reduced to $\frac{1}{27}$
	True grand-father	$\frac{1}{6}$		Father	$\frac{1}{6} = \frac{4}{24}$ reduced to $\frac{1}{27}$
	True grand-mother	$\frac{1}{6}$			
87	Daughter	$\frac{1}{2} = \frac{6}{12}$ reduced to $\frac{1}{15}$	90	Mother or true grand mother (maternal)	$\frac{1}{6} = \frac{4}{24}$ reduced to $\frac{1}{27}$
	Son's daughter	$\frac{1}{6} = \frac{2}{12}$ reduced to $\frac{1}{15}$		Daughter	$\frac{1}{2} = \frac{6}{12}$ reduced to $\frac{1}{15}$
	Husband	$\frac{1}{2} = \frac{6}{12}$ reduced to $\frac{1}{15}$		Son's daughter or son's daughters	$\frac{1}{6} = \frac{4}{24}$ reduced to $\frac{1}{27}$
	Father	$\frac{1}{6} = \frac{2}{12}$ reduced to $\frac{1}{15}$		Wife or wives	$\frac{1}{6} = \frac{4}{24}$ reduced to $\frac{1}{27}$
	Mother or true grand mother (maternal)	$\frac{1}{6} = \frac{2}{12}$ reduced to $\frac{1}{15}$		True grand-father	$\frac{1}{6} = \frac{4}{24}$ reduced to $\frac{1}{27}$
88	Daughter	$\frac{1}{2} = \frac{6}{12}$ reduced to $\frac{1}{15}$	91	Mother or true grand mother (maternal or paternal)	$\frac{1}{6} = \frac{4}{24}$ reduced to $\frac{1}{27}$
	Son's daughter	$\frac{1}{6} = \frac{2}{12}$ reduced to $\frac{1}{15}$		Daughter	$\frac{1}{2} = \frac{6}{12}$
	Husband	$\frac{1}{2} = \frac{6}{12}$ reduced to $\frac{1}{15}$		Son's daughter or son's daughters	$\frac{1}{6} = \frac{2}{12}$
	True grand-father	$\frac{1}{6} = \frac{2}{12}$ reduced to $\frac{1}{15}$		Husband	$\frac{1}{2} = \frac{6}{12}$
	Mother or true grand mother (maternal or paternal)	$\frac{1}{6} = \frac{2}{12}$ reduced to $\frac{1}{15}$		Full brothers, full sisters, or consanguine brothers, sisters or any residuary Nos 16—25	$\frac{1}{2}$ (R)

Examples 90 to 95 are really cases of the daughter with three heirs since we can group the brother and sister as residuaries

No	Heirs	Shares	No	Heirs	Shares
92	Daughter	$\frac{1}{2} = \frac{12}{24}$	95	Daughter	$\frac{1}{2} = \frac{12}{24}$
	Son's daughter or son's daughters	$\frac{1}{6} = \frac{4}{24}$		Wife or wives	$\frac{1}{3} = \frac{8}{24}$
	Wife or wives	$\frac{1}{3} = \frac{8}{24}$		Mother or true grandmother (maternal or paternal)	$\frac{1}{6} = \frac{4}{24}$
	Full brothers, full sisters or consanguine brothers, consanguine sisters or any residuary Nos 16—25	$\frac{5}{24} (R)$		Full brothers, sisters or consanguine brothers or sisters	$\frac{5}{24} (R)$
93	Daughter	$\frac{1}{6} = \frac{4}{24}$	<i>Illustrations of daughters with one heir</i>		
	Son's daughters	$\frac{1}{6}$			
	Mother or true grandmother	$\frac{1}{6}$			
	Full brothers, full sisters or consanguine brothers, consanguine sisters or any residuary Nos 16—25	$\frac{1}{6} (R)$	96	Daughters	$\frac{2}{3}$
				Son's son, his or father or true grandfather or full brother, sister or consanguine brother or sister or any residuary Nos 16—25	$\frac{1}{3}$
94	Daughter	$\frac{1}{2} = \frac{12}{24}$			
	Husband	$\frac{1}{4} = \frac{6}{24}$			
	Mother or true grandmother (maternal or paternal)	$\frac{1}{8} = \frac{3}{24}$	97	Daughters	$\frac{1}{2} = (\frac{1}{4} + \frac{1}{4})$ by return
	Full brothers, Full sisters or consanguine brothers, or sisters	$\frac{1}{12} (R)$		Husband	$\frac{1}{4}$
			98	Daughters	$\frac{2}{3} = (\frac{1}{2} + \frac{1}{6})$ by return
				Wife or wives	$\frac{1}{3}$

Examples 90 to 95 are really cases of the daughter with three heirs since we can group the brother and sister as residuaries

No	Heirs	Shares	No	Heirs	Shares
99	Daughters	$\frac{2}{3} = \frac{1}{3}$ increased to $\frac{4}{5}$	104	Daughters	$\frac{2}{3} = \frac{8}{12}$ reduced to $\frac{8}{15}$
	Mother or true grandmothers	$\frac{1}{6}$ increased to $\frac{1}{5}$		Husband	$\frac{1}{4} = \frac{3}{12}$ reduced to $\frac{3}{15}$
	<i>Illustrations of daughters together with two heirs</i>			Father or true grandfather	$\frac{1}{6} = \frac{2}{12}$ reduced to $\frac{2}{15}$
100	Daughters	$\frac{2}{3}$	105	Daughters	$\frac{2}{3} = \frac{8}{12}$ reduced to $\frac{8}{15}$
	Son's son or son's sons	$\frac{1}{3}$		Husband	$\frac{1}{4} = \frac{3}{12}$ reduced to $\frac{3}{15}$
	Son's daughter or son's daughters			Mother or true grandmother (maternal or paternal)	$\frac{1}{6} = \frac{2}{12}$ reduced to $\frac{2}{15}$
101	Daughters	$\frac{2}{3} = \frac{8}{12}$	106	Daughters	$\frac{2}{3} = \frac{8}{12}$
	Son's son	$\frac{1}{3} (R)$		Husband	$\frac{1}{4} = \frac{3}{12}$
	Husband	$\frac{1}{4} = \frac{3}{12}$		Full brother or sister or consanguine brother or sister or any residuary Nos 16—25	$\frac{1}{12} (R)$
102	Daughters	$\frac{2}{3} = \frac{8}{12}$	107	Daughters	$\frac{2}{3} = \frac{8}{12}$
	Son's son or Son's son's son hls	$\frac{5}{24} (R)$		Wife or wives	$\frac{1}{4} = \frac{3}{12}$
	Wife	$\frac{1}{4} = \frac{3}{12}$	108	Father or true grandfather	$\frac{5}{24} (R)$
103	Daughters	$\frac{2}{3} = \frac{8}{12}$		Daughters $\frac{2}{3}$ ¹	$\frac{2}{3}$ of $\frac{1}{4} (R)$ $= \frac{2}{12}$ $= \frac{1}{6}$
	Son's son hls	$\frac{1}{3} (R)$		Wife $\frac{1}{4}$	$\frac{1}{4}$ of $\frac{1}{6} (R)$ $= \frac{1}{24}$
	Father or true grandfather or mother or true grandmother (maternal or paternal)	$\frac{1}{6}$		Mother or true grandmother $\frac{1}{6}$ (maternal or paternal)	$\frac{1}{6}$ of $\frac{1}{6} (R)$ $= \frac{1}{36}$

¹ Here we first assign to the wife her share $\frac{1}{4}$; thereafter distribute the residue $\frac{1}{4}$ between the other two heirs in terms of their share $\frac{2}{3}$ and $\frac{1}{3}$, i.e., $\frac{4}{6}$ or $\frac{2}{3}$ and $\frac{1}{6}$.

No	Heirs	Shares	No	Heirs	Shares
117	Daughters	$\frac{1}{3} = \frac{4}{12}$	121	Daughters	$\frac{1}{3} = \frac{8}{24}$ reduced to $\frac{8}{18}$
	Son's sons	$\frac{1}{6}$ (R)		Husband	$\frac{1}{4} = \frac{3}{12}$ reduced to $\frac{3}{18}$
	Son's daughters			True grandfather	$\frac{1}{8} = \frac{2}{16}$ reduced to $\frac{2}{18}$
	Mother or true grandmother	$\frac{1}{6}$		True grandmother (paternal)	$\frac{1}{8} = \frac{2}{16}$ reduced to $\frac{2}{18}$
118	Daughters ¹	$\frac{1}{2} = \frac{6}{12}$	122	Daughters	$\frac{1}{3} = \frac{8}{24}$
	Son's sons	$\frac{1}{24}$ (R)		Husband	$\frac{1}{4} = \frac{6}{24}$
	Father or true grandfather	$\frac{1}{8} = \frac{3}{24}$		Full brothers, sisters or consanguine brother, sisters	$\frac{1}{12}$ (R)
	Wife or wives	$\frac{1}{8} = \frac{3}{24}$			
119	Daughters	$\frac{1}{2} = \frac{6}{12}$	123	Daughters	$\frac{1}{3} = \frac{8}{24}$ reduced to $\frac{8}{17}$
	Son's sons	$\frac{1}{24}$ (R)		Wife or wives	$\frac{1}{8} = \frac{3}{24}$ reduced to $\frac{3}{17}$
	Wife or wives	$\frac{1}{8} = \frac{3}{24}$		Father or true grandfather	$\frac{1}{8} = \frac{3}{24}$ reduced to $\frac{3}{17}$
	Mother or true grandmother	$\frac{1}{8} = \frac{3}{24}$		Mother or true grandmother (maternal)	$\frac{1}{8} = \frac{3}{24}$ reduced to $\frac{3}{17}$
120	Daughters	$\frac{2}{3} = \frac{8}{12}$ reduced to $\frac{8}{16}$	124	Daughters	$\frac{1}{3} = \frac{8}{24}$ reduced to $\frac{8}{17}$
	Husband	$\frac{1}{4} = \frac{3}{12}$ reduced to $\frac{3}{16}$		Wife or wives	$\frac{1}{8} = \frac{3}{24}$ reduced to $\frac{3}{17}$
	Father or true grandfather	$\frac{1}{6} = \frac{2}{12}$ reduced to $\frac{2}{16}$		True grandfather	$\frac{1}{8} = \frac{3}{24}$ reduced to $\frac{3}{17}$
	Mother or true grandmother (maternal)	$\frac{1}{8} = \frac{2}{16}$ reduced to $\frac{2}{17}$		True grandmother	$\frac{1}{8} = \frac{3}{24}$ reduced to $\frac{3}{17}$

¹ In examples 118 and 119 the result will be the same if we group son's daughter along with son's son, they both will inherit as residuaries, and the number of heirs will be increased to four

No	Heirs	Shares	No	Heirs	Shares
125	Daughters	$\frac{1}{2}$	129	<i>Illustrations of daughter together with four heirs</i>	
	Wife or wives	$\frac{1}{2}$		Daughters	$\frac{1}{2}$
	Mother or true grandmother	$\frac{1}{6}$		Son's son } Son's daughter }	$\frac{1}{2}$ (R)
	Full brothers or sisters or consanguine brothers or sisters, or any residuary Nos 10—25	$\frac{1}{2}$ (R)		Wife or wives	$\frac{1}{2}$
126	Daughters	$\frac{1}{2}$		Father or true grandfather	$\frac{1}{3}$
	Wife or wives	$\frac{1}{2}$		Mother or true grandmother (maternal or paternal)	$\frac{1}{3}$
	Full brothers, full sisters or consanguine brothers, sisters	$\frac{1}{2}$ (R)	130	Daughters ¹	$\frac{1}{2}$
127	Daughters	$\frac{1}{2}$		Son's daughters, Son's son's sons, Son's son's daughters	$\frac{1}{2}$ (R)
	Mother	$\frac{1}{3}$		Husband	$\frac{1}{2}$
	Full brothers } Full sisters or consanguine brothers, sisters }	$\frac{1}{3}$			
128	Daughters	$\frac{1}{2}$	131	Daughters	$\frac{1}{2}$
	True grandmother	$\frac{1}{3}$		Son's daughter, Son's son's sons, Son's son's daughters	$\frac{1}{2}$ (R)
	Full brothers } Full sisters or consanguine brothers, sisters }	$\frac{1}{3}$ (R)		Wife or wives	$\frac{1}{2}$

¹ In examples 130, and 131 son's son's daughter of a lower degree, and the son's daughter are made residuaries with the son's son's son (he may even be of a lower degree) they all inherit as residuaries

No	Heirs	Shares	No	Heirs	Shares
132	Daughters	$1 = \frac{1}{2}$	138	Son's son or sons	$\frac{2}{3}$ (R)
	Wife or wives	$\frac{1}{2} = \frac{1}{2}$		Son's daughter or daughters	
	Mother	$\frac{1}{2} = \frac{1}{2}$		Father or mother or true grand-mother or true grandfather	
	Full brother, Full sister or consanguine brother sister	$\frac{1}{2}$ (R)			
	<i>Illustrations of son's son together with one heir</i>		139	Son's son or sons	$\frac{1}{2}$ (R)
				Husband	$\frac{1}{2} = \frac{1}{2}$
				Father or mother or true grand-mother or true grandfather	$\frac{1}{2} = \frac{1}{2}$
133	Son's son	$\frac{1}{2}$			
	Son's daughter	$\frac{1}{2}$			
134	Son's son or sons	$\frac{1}{2}$ (R)	140	Son's son or sons	$\frac{1}{2}$ (R)
	Husband	$\frac{1}{2}$		Wife or wives	$\frac{1}{2} = \frac{1}{2}$
135	Son's son or sons	$\frac{1}{2}$ (R)		Father or mother or true grand-mother or true grandfather	$\frac{1}{2} = \frac{1}{2}$
	Wife or wives	$\frac{1}{2}$			
136	Son's son or sons	$\frac{1}{2}$ (R)	141	Son's son or sons	$\frac{1}{2}$ (R)
	Father or mother or true grand-mother or true grandfather	$\frac{1}{2}$		Father or true grandfather	$\frac{1}{2}$
				Mother or true grandmother (maternal)	$\frac{1}{2}$
	<i>Illustrations of son's son together with two heirs</i>		142	Son's son or sons	$\frac{1}{2}$ (R)
137	Son's son or sons	$\frac{1}{2}$ (R)		True grand-mother	$\frac{1}{2}$
	Son's daughter or daughters			True grandfather	$\frac{1}{2}$
	Wife or wives	$\frac{1}{2}$			

No	Heirs	Shares	No	Heirs	Shares
	<i>Illustrations of sons's son together with three heirs *</i>		143	Son's sons } Son's daughters }	$\frac{1}{3}$ (R)
143	Son's son or sons } Son's daughter or daughters }	$\frac{7}{12}$ (R)		True grandfather	$\frac{1}{6}$
	Husband	$\frac{1}{2} = \frac{3}{6}$		True grandmother	$\frac{1}{6}$
	Father or mother or true grandmother or true grandfather	$\frac{1}{6} = \frac{1}{6}$	147	Son's son or sons	$\frac{1}{2}$ (R)
				Husband	$\frac{1}{2} = \frac{1}{2}$
				Father or true grandfather	$\frac{1}{6} = \frac{1}{6}$
144	Son's son or sons } Son's daughter or daughters }	$\frac{17}{24}$ (R)		Mother or true grandmother	$\frac{1}{6} = \frac{1}{6}$
	Wife or wives	$\frac{1}{8} = \frac{3}{24}$	148	Son's son or sons	$\frac{1}{2}$ (R)
	Father or mother or true grandmother or true grandfather	$\frac{1}{6} = \frac{4}{24}$		Husband	$\frac{1}{2} = \frac{1}{2}$
				True grandfather	$\frac{1}{6} = \frac{1}{6}$
				True grandmother	$\frac{1}{6} = \frac{1}{6}$
145	Son's son or sons } Son's daughter or daughters }	$\frac{4}{9}$ (R)	149	Son's son or sons	$\frac{18}{24}$ (R)
	Father or true grandfather	$\frac{1}{3}$		Wife or wives	$\frac{1}{8} = \frac{3}{24}$
	Mother or true grandmother (maternal)	$\frac{1}{6}$		Father or true grandfather	$\frac{1}{6} = \frac{4}{24}$
				Mother or true grandmother (maternal)	$\frac{1}{6} = \frac{4}{24}$

* Illustrations Nos 143—146 are similar to 139—142

No	Heirs	Shares	No	Heirs	Shares
150	Son's son or sons	$\frac{1}{2\frac{1}{2}}$ (R)	154	Son's daughter	$\frac{2}{3} = (\frac{1}{2} + \frac{1}{4})$ by return $\frac{1}{4}$
	Wife or wives	$\frac{1}{8} = \frac{2}{16}$		Husband	
	True grand-mother	$\frac{1}{8} = \frac{2}{16}$	155	Son's daughter	$\frac{2}{3} = (\frac{1}{2} + \frac{1}{6})$ by return $\frac{1}{6}$
	True grand-father	$\frac{1}{8} = \frac{2}{16}$		Wife or wives	
	<i>Illustration of son's son together with four heirs *</i>		156	Son's daughter	$\frac{1}{2}$
151	Son's sons } Son's daughters }	$\frac{1}{2\frac{1}{2}}$ (R)		Father or true grandfather or full brother or sister or consanguine brother or sister or any residuary Nos 16-20	$\frac{1}{2}$
	Wife or wives	$\frac{1}{8} = \frac{2}{16}$			
	True grand-mothers† (maternal and paternal)	$\frac{1}{8} = \frac{2}{16}$	157	Son's daughter	$\frac{1}{2} = \frac{3}{6}$ increased to $\frac{4}{6}$
	<i>Illustrations of son's daughter together with one heir †</i>			Mother or true grandmother	$\frac{1}{6}$ increased to $\frac{1}{2}$
152	Son's daughter	$\frac{1}{2}$		<i>Illustrations of Husband together with one heir</i>	
	Son's son's son	$\frac{1}{2}$ (R)			
153	Son's daughter	$\frac{1}{2} = \frac{8}{16}$ increased to $\frac{9}{16}$	158	Husband	$\frac{1}{2}$
	Son's sons, daughter or daughters	$\frac{1}{8}$ increased to $\frac{1}{4}$		Mother, father, true grand-mother or true grandfather	$\frac{1}{2} = (\frac{1}{8} + \frac{3}{8})$ by return)

* Similar to the case of three heirs, vide No 144, and when with husband vide No 143

† We do not propose to state all cases of son's daughter with two or more heirs, their cases are identical with the cases of daughter or daughters with other heirs as stated in previous cases

No	Heirs	Share	No	Heirs	Shares
159	Husband ¹ Full brothers or sisters or consanguine brothers or sisters or any residuary Nos 16-25	$\frac{1}{2}$ $\frac{1}{2}$ (R)	163	Husband True grand-mother (maternal or paternal) True grand-father or full brother or consanguine brother or any residuary Nos 16-25	$\frac{1}{2} = \frac{3}{6}$ $\frac{1}{6}$ $\frac{2}{6}$ (R)
	<i>Illustrations of Husband together with two heirs</i>		164	Husband Mother	$\frac{1}{2} = \frac{4}{8}$ reduced to $\frac{3}{8}$ $\frac{1}{8} = \frac{2}{8}$ reduced to $\frac{2}{8}$
160	Husband Father Mother	$\frac{1}{2} = \frac{2}{4}$ $\frac{2}{3}$ of $\frac{1}{2} = \frac{2}{6}$ $\frac{1}{4}$ of $\frac{1}{2} = \frac{1}{4}$		Full sister or consanguine sister	$\frac{1}{2} = \frac{3}{6}$ reduced to $\frac{1}{6}$
161	Husband Father True grand-mother (maternal)	$\frac{1}{2} = \frac{2}{4}$ $\frac{2}{3}$ (R) $\frac{1}{3}$	165	Husband Mother Uterine brother or uterine sister	$\frac{1}{2} = \frac{3}{6}$ $\frac{1}{3} = \frac{2}{6}$ $\frac{1}{6}$
162	Husband Mother True grand-father or full brother or consanguine brother or any residuary Nos 16-25	$\frac{1}{2} = \frac{3}{6}$ $\frac{1}{3} = \frac{2}{6}$ $\frac{1}{6}$ (R)	166	Husband Mother or true grandmother Full brothers or consanguine brothers	$\frac{1}{2} = \frac{3}{6}$ $\frac{1}{6}$ $\frac{2}{6}$ (R)

¹ Similar will be the case if the husband were to co-exist with any distant kindred class (i) or (ii) or (iii) or (iv) or with the successor by contract or the acknowledged kinsman or the universal legatee but in absence of all these the residue will devolve upon the husband by return *radd*

No	Heirs	Shares	No	Heirs	Shares
167	Husband	$\frac{1}{2} = \frac{2}{4}$	172	Husband	$\frac{1}{2} = \frac{2}{4}$
	Mother or true grandmother	$\frac{1}{8}$		Full or consanguine brother or brothers or any residuary Nos 16—25	$\frac{1}{8}$ (R)
	Uterine brothers or sisters	$\frac{1}{4} = \frac{2}{8}$			
168	Husband	$\frac{1}{2} = \frac{2}{4}$ reduced to $\frac{1}{4}$		Uterine brothers or sisters	$\frac{1}{8} = \frac{2}{16}$
	Mother or true grandmother	$\frac{1}{8} = \frac{2}{16}$ reduced to $\frac{1}{16}$	173	Husband	$\frac{1}{2} = \frac{8}{16}$ reduced to $\frac{2}{8}$
	Full or consanguine sisters	$\frac{1}{4} = \frac{4}{16}$ reduced to $\frac{2}{8}$		Full sister	$\frac{1}{2} = \frac{8}{16}$ reduced to $\frac{2}{8}$
169	Husband	$\frac{1}{2}$		Consanguine sister or sisters	$\frac{1}{8}$ reduced to $\frac{1}{4}$
	Full brothers Full sisters or consanguine brothers or sisters	$\frac{1}{2}$ (R)	174	Husband	$\frac{1}{2} = \frac{8}{16}$ reduced to $\frac{2}{8}$
170	Husband	$\frac{1}{2} = \frac{2}{4}$		Full or consanguine sister	$\frac{1}{2} = \frac{8}{16}$ reduced to $\frac{2}{8}$
	True grandmother ($\frac{1}{8}$)	$\frac{1}{2}$ of $\frac{1}{8}$ $\frac{1}{2}$ (R) = $\frac{1}{4}$		Uterine brother or sister	$\frac{1}{8}$ reduced to $\frac{1}{4}$
	Uterine brother or uterine sister ($\frac{1}{8}$)	$\frac{1}{2}$ of $\frac{1}{8}$ (R) = $\frac{1}{4}$	175	Husband	$\frac{1}{2} = \frac{8}{16}$ reduced to $\frac{2}{8}$
171	Husband	$\frac{1}{2} = \frac{2}{4}$		Full sister or consanguine sister	$\frac{1}{2} = \frac{8}{16}$ reduced to $\frac{2}{8}$
	Full or consanguine brother or brothers or any residuary Nos 16—25	$\frac{2}{8}$ (R)		Uterine brothers or sisters or brother and sister	$\frac{1}{2} = \frac{8}{16}$ reduced to $\frac{2}{8}$
	Uterine brother or sister	$\frac{1}{8}$			

No	Heirs	Shares	No	Heirs	Shares
176	Husband	$\frac{1}{2} = \frac{2}{4}$ reduced to $\frac{1}{4}$	179	Husband	$\frac{1}{2} = \frac{2}{4}$
	Full sisters or consanguine sisters	$\frac{2}{3} = \frac{4}{6}$ reduced to $\frac{2}{6}$		Uterine brothers or sisters or one uterine brother and sister	$\frac{1}{3} = \frac{2}{6}$
	Uterine brother or sister	$\frac{1}{2}$ reduced to $\frac{1}{4}$		Full brother or consanguine brother or any residuary Nos 16-25	$\frac{1}{6}$ (R)
177	Husband	$\frac{1}{2} = \frac{2}{4}$ reduced to $\frac{1}{4}$		<i>Illustrations of Husband together with three heirs</i>	
	Full sisters or consanguine sisters	$\frac{1}{3} = \frac{2}{6}$ reduced to $\frac{1}{6}$	180	Husband	$\frac{1}{2} = \frac{3}{6}$
	Uterine brothers or sisters or brother and sister	$\frac{1}{2} = \frac{3}{6}$ reduced to $\frac{2}{6}$		Mother or true grandmother	$\frac{1}{6}$
	Husband	$\frac{1}{2} = \frac{3}{6}$ reduced to $\frac{2}{6}$		Full sisters Full brothers or consanguine brothers and sisters	$\frac{1}{6}$ (R)
	True grandfather	$\frac{1}{6}$ reduced to $\frac{1}{12}$	181	Husband	$\frac{1}{2} = \frac{3}{6}$
	Full sister or consanguine sister	$\frac{1}{2} = \frac{3}{6}$ reduced to $\frac{2}{6}$		Mother, or true grandmother	$\frac{1}{6}$
				Uterine brothers or sisters	$\frac{1}{3} = \frac{2}{6}$
178	Husband	$\frac{1}{2} = \frac{2}{4}$	182	Husband	$\frac{1}{2} = \frac{2}{4}$ reduced to $\frac{1}{4}$
	Uterine brother or sister	$\frac{1}{2}$		Mother or true grandmother	$\frac{1}{4}$ reduced to $\frac{1}{8}$
	Full or consanguine brother or any residuary Nos 16-25	$\frac{2}{3}$ (R)		Full sister	$\frac{1}{2} = \frac{2}{4}$ reduced to $\frac{1}{4}$
				Consanguine sister	$\frac{1}{4}$ reduced to $\frac{1}{8}$

No	Heirs	Shares	No	Heirs	Shares
183	Husband	$\frac{1}{2} = \frac{2}{4}$ reduced to $\frac{1}{4}$	186	Husband	$\frac{1}{2} = \frac{2}{4}$
	Mother or true grandmother	$\frac{1}{8}$ reduced to $\frac{1}{4}$		Mother or true grandmother	$\frac{1}{8}$
	Full sister or consanguine sister	$\frac{1}{2} = \frac{4}{8}$ reduced to $\frac{1}{4}$		Full sister or sisters Full brother or brothers	$\frac{2}{8}$ (R)
	Uterine brother or uterine sister	$\frac{1}{8}$ reduced to $\frac{1}{4}$	187	Husband	$\frac{1}{2} = \frac{4}{8}$ reduced to $\frac{2}{8}$
184	Husband	$\frac{1}{2} = \frac{2}{4}$ reduced to $\frac{2}{8}$		Mother or true grandmother	$\frac{1}{8}$ reduced to $\frac{1}{8}$
	Mother or true grandmother	$\frac{1}{8}$ reduced to $\frac{1}{8}$		Full sister	$\frac{1}{2} = \frac{4}{8}$ reduced to $\frac{2}{8}$
	Full sister or consanguine sister	$\frac{1}{2} = \frac{4}{8}$ reduced to $\frac{2}{8}$	188	Consanguine sister	$\frac{1}{8}$ reduced to $\frac{1}{8}$
	Two or more uterine brothers or sisters	$\frac{1}{2} = \frac{4}{8}$ reduced to $\frac{2}{8}$		Husband	$\frac{1}{2} = \frac{4}{8}$
185	Husband	$\frac{1}{2} = \frac{2}{4}$ reduced to $\frac{2}{8}$		Mother or true grandmother	$\frac{1}{8}$
	Mother or true grandmother	$\frac{1}{8}$ reduced to $\frac{1}{8}$		Full brothers or consanguine brothers or any residuary Nos 16—25	$\frac{1}{8}$ (R)
	Full sisters or consanguine sisters	$\frac{5}{8} = \frac{5}{8}$ reduced to $\frac{5}{8}$		Uterine brother or uterine sister	$\frac{1}{8}$
	Uterine brother or uterine sister	$\frac{1}{8}$ reduced to $\frac{1}{8}$	189	Husband	$\frac{1}{2} = \frac{4}{8}$ reduced to $\frac{2}{8}$
				Mother or true grandmother	$\frac{1}{8}$ reduced to $\frac{1}{8}$
				Full sister or consanguine sister	$\frac{1}{2} = \frac{4}{8}$ reduced to $\frac{2}{8}$

No	Heirs	Shares	No	Heirs	Shares
190	Husband	$\frac{1}{2} = \frac{2}{4}$ reduced to $\frac{1}{4}$	<i>Illustration of the husband together with four heirs</i>		
	Mother or true grandmother	$\frac{1}{8}$ reduced to $\frac{1}{16}$			
	Full sisters or consanguine sisters	$\frac{2}{3} = \frac{4}{6}$ reduced to $\frac{4}{16}$			
	Uterine brothers or sisters	$\frac{1}{4} = \frac{2}{8}$ reduced to $\frac{2}{16}$			
191	Husband	$\frac{1}{2} = \frac{2}{4}$ reduced to $\frac{1}{4}$	193	Husband	$\frac{1}{2} = \frac{2}{4}$
	Mother or true grandmother	$\frac{1}{8}$ reduced to $\frac{1}{16}$		Mother or true grandmother	$\frac{1}{8}$
	Full sisters or consanguine sisters	$\frac{2}{3} = \frac{4}{6}$ reduced to $\frac{4}{16}$		Full brother, sister or consanguine brother, sister	$\frac{1}{8}$ R
	Uterine brothers or sisters	$\frac{1}{4} = \frac{2}{8}$ reduced to $\frac{2}{16}$		Uterine brother, or sister*	$\frac{1}{8}$
192	Husband	$\frac{1}{2} = \frac{2}{4}$	<i>Illustrations of wife or wives together with one heir †</i>		
	True grandmother	$\frac{1}{8}$			
	Uterine brother or sister	$\frac{1}{4}$			
	Full brother or consanguine brother or any residuary Nos 16—25	$\frac{1}{8}$ (R)			
			194	Wife or wives	$\frac{1}{4}$
				Father or mother or true grandmother or true grandfather	$\frac{2}{3}$ (R)
			195	Wife or wives	$\frac{1}{4}$
				Full brother or sister or consanguine brother or sister or any residuary Nos 16—25†	$\frac{2}{3}$ (R)

* This case is similar to No 192 here the Full sister is taken as a separate heir

† Similarly the residue will go in default of these heirs to the distant kindred class (i) or (ii) or (iii) or (iv) or to the successor by contract or the acknowledged kinsman, or the universal legatee, but in absence of all these it will devolve under the Hanafi Law upon the wife

No	Heirs	Shares	No	Heirs	Shares
196	<i>Illustrations of wife or wives together with two heirs</i>		200	Wife or wives	$\frac{1}{2} = \frac{2}{4}$ reduced to $\frac{1}{4}$
				Mother	$\frac{1}{2} = \frac{2}{4}$ reduced to $\frac{1}{4}$
	Wife or wives	$\frac{1}{2}$	201	One full sister or one consanguine sister	$\frac{1}{2} = \frac{2}{4}$ reduced to $\frac{1}{4}$
197	Father	$\frac{2}{3}$ of $\frac{1}{2}$ (R) = $\frac{1}{3}$		Wife or wives	$\frac{1}{2}$
	Mother	$\frac{1}{3}$ of $\frac{2}{3}$ (R) = $\frac{1}{3}$		Mother ($\frac{1}{2} = \frac{2}{4}$)	$\frac{2}{3}$ of $\frac{1}{3}$ (R) = $\frac{2}{9}$
	Wife or wives	$\frac{1}{2} = \frac{3}{6}$	202	Uterine brother or uterine sister ($\frac{1}{2}$)	$\frac{1}{3}$ of $\frac{1}{3}$ (R) = $\frac{1}{9}$
198	Father	$\frac{7}{12}$ (R)		Wife or wives	$\frac{1}{2} = \frac{3}{6}$
	True grandmother (maternal)	$\frac{1}{6} = \frac{2}{12}$	203	Mother or true grandmother	$\frac{1}{6} = \frac{2}{12}$
	Wife or wives	$\frac{1}{2} = \frac{3}{6}$		Full or consanguine brothers	$\frac{7}{12}$ (R)
199	Mother	$\frac{1}{3} = \frac{4}{12}$	204	Wife or wives	$\frac{1}{2}$
	True grandfather or full brother or consanguine brother or any residuary Nos 16—25	$\frac{5}{12}$ (R.)		Mother or true grandmother ($\frac{1}{6}$)	$\frac{1}{3}$ of $\frac{1}{3}$ (R) = $\frac{1}{9}$
	Wife or wives	$\frac{1}{2} = \frac{3}{6}$		Uterine brothers or sisters or brother and sister ($\frac{1}{2} = \frac{2}{4}$)	$\frac{2}{3}$ of $\frac{1}{3}$ (R) = $\frac{2}{9}$
200	True grandmother	$\frac{1}{6} = \frac{2}{12}$	205	Wife or wives	$\frac{1}{2} = \frac{3}{6}$ reduced to $\frac{1}{3}$
	True grandfather or brother or consanguine brother or any residuary No 16—25	$\frac{7}{12}$ (R)		Mother or true grandmother	$\frac{1}{6} = \frac{2}{12}$ reduced to $\frac{1}{18}$
				Full or consanguine sisters	$\frac{1}{3} = \frac{4}{12}$ reduced to $\frac{1}{9}$

No	Heirs	Shares	No	Heirs	Shares
205	Wife or wives	$\frac{1}{4}$	210	Wife or wives	$\frac{1}{4} = \frac{1}{16}$
	Full brothers Full sisters or consanguine brothers, sisters	$\frac{1}{4} (R)$		Full sister or consanguine sister ($\frac{1}{2} = \frac{1}{6}$)	$\frac{1}{4}$ of $\frac{1}{4} (R)$ $= \frac{1}{16}$
206	Wife or wives	$\frac{1}{4} = \frac{2}{8}$		Uterine brother or sister $\frac{1}{2}$	$\frac{1}{4}$ of $\frac{1}{4} (R)$ $= \frac{1}{16}$
	True grand- mother ($\frac{1}{8}$)	$\frac{1}{4}$ of $\frac{1}{4} (R)$ $= \frac{1}{16}$	211	Wife or wives	$\frac{1}{4} = \frac{1}{12}$ reduced to $\frac{1}{12}$
	Uterine brother or one uterine sister ($\frac{1}{2}$)	$\frac{1}{4}$ of $\frac{1}{4} (R)$ $= \frac{1}{16}$		Full sister or consanguine sister	$\frac{1}{4} = \frac{1}{12}$ reduced to $\frac{1}{12}$
207	Wife or wives	$\frac{1}{4} = \frac{1}{12}$		Uterine brothers or sisters	$\frac{1}{4} = \frac{1}{12}$ reduced to $\frac{1}{12}$
	Full or consan- guine brothers or any resi- duary Nos 16—25	$\frac{1}{12} (R)$	212	Wife or wives	$\frac{1}{4} = \frac{1}{12}$ reduced to $\frac{1}{12}$
	Uterine brother or one uterine sister	$\frac{1}{4} = \frac{1}{12}$		Full sisters or consanguine sisters	$\frac{1}{4} = \frac{1}{12}$ reduced to $\frac{1}{12}$
208	Wife or wives	$\frac{1}{4} = \frac{1}{12}$		Uterine brother or sister	$\frac{1}{4} = \frac{1}{12}$ reduced to $\frac{1}{12}$
	Full brother or consanguine brother or any residuary Nos 16—25	$\frac{1}{12} (R)$	213	Wife or wives	$\frac{1}{4} = \frac{1}{12}$ reduced to $\frac{1}{12}$
	Uterine brothers and sisters	$\frac{1}{4} = \frac{1}{12}$		Full sisters or consanguine sisters	$\frac{1}{4} = \frac{1}{12}$ reduced to $\frac{1}{12}$
209	Wife or wives	$\frac{1}{4} = \frac{1}{12}$		Uterine brothers or sisters or brother and sister	$\frac{1}{4} = \frac{1}{12}$ reduced to $\frac{1}{12}$
	Full sister ($\frac{1}{2} = \frac{2}{3}$)	$\frac{1}{4}$ of $\frac{1}{4} (R)$ $= \frac{1}{16}$			
	Consanguine sister or sis- ters ($\frac{1}{2}$)	$\frac{1}{4}$ of $\frac{1}{4} (R)$ $= \frac{1}{16}$			

No	Heirs	Shares	No	Heirs	Shares
221	Wife or wives	$\frac{1}{2} = \frac{2}{4}$ reduced to $\frac{1}{2}$	224	Wife or wives	$\frac{1}{2} = \frac{2}{4}$
	Mother or true grandmother	$\frac{1}{6} = \frac{2}{12}$ reduced to $\frac{2}{12}$		Mother or true grandmother	$\frac{1}{6} = \frac{2}{12}$
	Full sisters or consanguine sister	$\frac{2}{3} = \frac{8}{12}$ reduced to $\frac{8}{12}$		Full brother or brothers or consanguine brother or brothers	$\frac{2}{3} (R)$
	Uterine brother or uterine sister	$\frac{1}{6} = \frac{2}{12}$ reduced to $\frac{2}{12}$		Uterine brother or uterine sister	$\frac{1}{6} = \frac{2}{12}$
222	Wife or wives	$\frac{1}{2} = \frac{2}{4}$	225	Wife or wives	$\frac{1}{2} = \frac{2}{4}$ reduced to $\frac{2}{7}$
	Mother or true grandmother	$\frac{1}{6} = \frac{2}{12}$		Mother or true grandmother	$\frac{1}{6} = \frac{2}{12}$ reduced to $\frac{2}{17}$
	Full brothers or sisters or consanguine brothers or sisters	$\frac{7}{12} (R)$		Two or more full or consanguine sisters	$\frac{3}{4} = \frac{6}{8}$ reduced to $\frac{6}{17}$
				Uterine brothers, sisters	$\frac{1}{4} = \frac{2}{8}$ reduced to $\frac{2}{17}$
223	Wife or wives	$\frac{1}{2} = \frac{2}{4}$ reduced to $\frac{2}{9}$	226	Wife or wives	$\frac{1}{2} = \frac{2}{4}$
	Mother or true grandmother	$\frac{1}{6} = \frac{2}{12}$ reduced to $\frac{2}{17}$		Mother	$\frac{1}{4} = \frac{2}{8}$
	Full sister	$\frac{1}{2} = \frac{2}{4}$ reduced to $\frac{2}{9}$		Uterine brother or sister	$\frac{1}{6} = \frac{2}{12}$
	Consanguine sister	$\frac{1}{6} = \frac{2}{12}$ reduced to $\frac{2}{18}$		Full or consanguine brother or any residuary Nos 16—25	$\frac{2}{9}$
			227	Wife or wives	$\frac{1}{2} = \frac{2}{4}$
				Mother	$\frac{1}{4} = \frac{2}{8}$
				Full sister	$\frac{1}{2} = \frac{2}{4}$
				Consanguine brother or any residuary Nos 16—25	$\frac{1}{2} (R)$

No	Heirs	Shares	No	Heirs	Shares
228	Wife or wives	$\frac{1}{4} = \frac{2}{8}$ reduced to $\frac{1}{17}$	231	Wife or wives	$\frac{1}{4} = \frac{2}{8}$ reduced to $\frac{1}{18}$
	Mother or true grandmother	$\frac{1}{8} = \frac{2}{16}$ reduced to $\frac{1}{17}$		Mother or true grandmother	$\frac{1}{8} = \frac{2}{16}$ reduced to $\frac{1}{18}$
	Full sisters or consanguine sisters	$\frac{2}{3} = \frac{8}{12}$ reduced to $\frac{6}{17}$		Full sister	$\frac{1}{2} = \frac{6}{12}$ reduced to $\frac{6}{18}$
	Uterine brothers sisters	$\frac{1}{4} = \frac{4}{16}$ reduced to $\frac{4}{17}$		Consanguine sister or sisters	$\frac{1}{8} = \frac{2}{16}$ reduced to $\frac{2}{18}$
229	Wife or wives	$\frac{1}{4} = \frac{2}{8}$	232	Wife or wives	$\frac{1}{4} = \frac{2}{8}$ reduced to $\frac{1}{17}$
	True grandmother	$\frac{1}{8} = \frac{2}{16}$		Mother or true grandmother	$\frac{1}{8} = \frac{2}{16}$ reduced to $\frac{2}{17}$
	Uterine brother or sister	$\frac{1}{8} = \frac{2}{16}$		Full sister	$\frac{1}{2} = \frac{6}{12}$ reduced to $\frac{6}{17}$
	Full brother or consanguine brother or any residuary Nos 16-25	$\frac{1}{12}$ (R)		Consanguine sister or sisters	$\frac{1}{8} = \frac{2}{16}$ reduced to $\frac{2}{17}$
230	<i>Illustrations of wife or wives together with four heirs</i>		233	Wife or wives	$\frac{1}{4} = \frac{2}{8}$
	Wife or wives ¹	$\frac{1}{4} = \frac{2}{8}$		Mother or true grandmother	$\frac{1}{8} = \frac{2}{16}$
	Mother or true grandmother	$\frac{1}{8} = \frac{2}{16}$		Full brothers	$\frac{1}{4} = \frac{2}{8}$ (R)
	Full brothers } Full sisters or consanguine brothers, sisters }	$\frac{1}{12}$ (R)		Full sisters or consanguine brothers, sisters }	
	Uterine brother or sister	$\frac{1}{8} = \frac{2}{16}$		Uterine brothers or sisters or brother and sister	$\frac{1}{4} = \frac{2}{8}$

¹ This case is similar to No 229

No	Heirs	Shares	No	Heirs	Shares
	<i>Illustrations of father together with one heir *</i>			Full sister or consanguine sister	$\frac{1}{2} = \frac{2}{4}$ increased to $\frac{2}{3}$
234	Father	$\frac{2}{3}$	240	Mother or true grandmother	$\frac{1}{6}$ increased to $\frac{1}{3}$
	Mother	$\frac{1}{3}$		Full sisters or consanguine sisters	$\frac{1}{2} = \frac{2}{4}$ increased to $\frac{2}{3}$
235	Father	$\frac{5}{6}$ (h)	241	Mother	$\frac{1}{3} = \frac{2}{6}$ increased to $\frac{2}{3}$
	True grandmother (maternal)	$\frac{1}{6}$		Uterine brother or sister	$\frac{1}{6}$ increased to $\frac{1}{3}$
	<i>Illustrations of mother together with one heir †</i>		242	Mother or true grandmother	$\frac{1}{6}$ increased to $\frac{1}{3}$
236	Mother	$\frac{2}{3}$		Uterine brothers, sisters	$\frac{1}{3} = \frac{2}{6}$ increased to $\frac{2}{3}$
	True grandfather	$\frac{2}{3}$ (R)	243	Mother	$\frac{1}{3}$
237	Mother	$\frac{1}{3}$		Nephew or consanguine nephew or any residuary Nos 18—25	$\frac{2}{3}$ (R)
	Full brother or consanguine brother	$\frac{2}{3}$ (R)		<i>Illustrations of mother together with two heirs</i>	
238	Mother or true grandmother	$\frac{1}{3}$	244	Mother or true grandmother	$\frac{1}{3}$
	Full brothers or consanguine brothers	$\frac{2}{3}$ (R)		Full brothers } Full sisters }	$\frac{2}{3}$ (R)
239	Mother	$\frac{1}{3} = \frac{2}{6}$ increased to $\frac{2}{3}$			

* For cases of father with two or more heirs *vide* preceding illustrations in cases of son's daughters, etc

† The case of the true grandmother or grandmothers whose fixed share is $\frac{1}{6}$ is identically the same as the case of the mother taking $\frac{1}{3}$, hence their cases have been included

No	Heirs	Shares	No	Heirs	Shares
245	Mother or true grandmother	$\frac{1}{8}$	250	Mother or true grandmother	$\frac{1}{8}$
	Full brother	$\frac{2}{3}$ (R)		Full sister	$\frac{1}{2} = \frac{2}{4}$
	Consanguine sisters	Excluded ¹		Uterine brothers, sisters	$\frac{1}{3} = \frac{2}{6}$
246	Mother or true grandmother	$\frac{1}{8}$	251	Mother	$\frac{1}{3} = \frac{2}{6}$
	Full brothers	$\frac{2}{3}$ (R)		Full sister	$\frac{1}{2} = \frac{2}{4}$
	Uterine brother	$\frac{1}{6}$		Full nephew or consanguine nephew, <i>i.e.</i> , any residuary Nos 16—25	$\frac{1}{6}$ (R)
247	Mother or true grandmother	$\frac{1}{8}$			
	Full brothers	$\frac{2}{3}$ (R)	252	Mother or true grandmother	$\frac{1}{8}$
	Uterine brothers or sisters	$\frac{1}{3} = \frac{2}{6}$		Full sisters	$\frac{2}{3} = \frac{4}{6}$
248	Mother or true grandmother	$\frac{1}{8}$ increased to $\frac{1}{3}$		Consanguine brother or brothers	$\frac{1}{6}$
	Full sister	$\frac{1}{2} = \frac{2}{4}$ increased to $\frac{2}{3}$	253	Mother or true grandmother	$\frac{1}{8}$
	Consanguine sister or sisters	$\frac{1}{6}$ increased to $\frac{1}{3}$		Full sisters	$\frac{2}{3} = \frac{4}{6}$
				Uterine brother or sister	$\frac{1}{6}$
249	Mother or true grandmother	$\frac{1}{8}$ increased to $\frac{1}{6}$	254	Mother or true grandmother	$\frac{1}{8}$ reduced to $\frac{1}{7}$
	Full sisters	$\frac{2}{3} = \frac{4}{6}$ increased to $\frac{2}{5}$		Full sisters	$\frac{2}{3} = \frac{4}{6}$ reduced to $\frac{4}{7}$
	Uterine brother or sister	$\frac{1}{6}$ increased to $\frac{1}{5}$		Uterine brothers, sisters	$\frac{1}{6} = \frac{2}{6}$ reduced to $\frac{2}{7}$

¹ Here the share of mother is reduced to $\frac{1}{3}$ from $\frac{1}{8}$, vide Illustration 237

No	Heirs	Shares	No	Heirs	Shares
255	Mother or true grandmother	$\frac{1}{8}$		Full nephew or consanguine nephew or any residuary Nos 16—25	$\frac{1}{8}$ (R)
	Full sister	$\frac{1}{2} = \frac{2}{4}$	200	Mother or true grandmother	$\frac{1}{8}$
	Full nephew or consanguine nephew, &c any residuary Nos 16—25	$\frac{1}{4} = \frac{2}{8}$		Consanguine sisters	$\frac{2}{4} = \frac{1}{2}$
256	Mother or true grandmother	$\frac{1}{8}$		Uterine brother or sister	$\frac{1}{4}$
	Consanguine brothers	$\frac{2}{8}$ (R)	261	Mother or true grandmother	$\frac{1}{8}$ reduced to $\frac{1}{4}$
	Uterine brothers, or sisters ¹	$\frac{1}{4} = \frac{2}{8}$		Consanguine sisters	$\frac{2}{8} = \frac{1}{4}$ reduced to $\frac{1}{8}$
257	Mother or true grandmother	$\frac{1}{8}$ increased to $\frac{1}{4}$		Uterine brothers or sisters	$\frac{1}{4} = \frac{2}{8}$ reduced to $\frac{1}{8}$
	Consanguine sister	$\frac{1}{2} = \frac{4}{8}$ increased to $\frac{3}{8}$	262	Mother or true grandmother	$\frac{1}{8}$
	Uterine brother or sister	$\frac{1}{8}$ increased to $\frac{1}{4}$		Consanguine sisters	$\frac{2}{8} = \frac{1}{4}$
258	Mother or true grandmother	$\frac{1}{8}$		Full nephew or consanguine nephew or any residuary Nos 18—25	$\frac{1}{8}$ (R)
	Consanguine sister	$\frac{1}{2} = \frac{4}{8}$	263	Mother	$\frac{1}{2} = \frac{4}{8}$
	Uterine brothers, or sisters	$\frac{1}{4} = \frac{2}{8}$		Uterine brother or sister	$\frac{1}{4}$
259	Mother	$\frac{1}{4} = \frac{2}{8}$		Full nephew or consanguine nephew or any residuary Nos 18—25	$\frac{1}{8}$ (R)
	Consanguine sister	$\frac{1}{2} = \frac{4}{8}$			

¹ One uterine will take $\frac{1}{4}$

No	Heirs	Shares	No	Heirs	Shares
264	Mother	$\frac{1}{4}$	268	Mother or true grandmother	$\frac{1}{6}$
	Uterine brothers, sisters	$\frac{1}{2} = \frac{2}{4}$		Full sister	$\frac{1}{2} = \frac{2}{4}$
	Any residuary Nos 16—25	$\frac{2}{4}$ (R)		Consanguine sister or sisters	$\frac{1}{6}$
265	<i>Illustrations of mother together with the heirs *</i>			Uterine brother or sister	$\frac{1}{6}$
	Mother or true grandmother	$\frac{1}{6}$	269	Mother or true grandmother	$\frac{1}{6}$ reduced to $\frac{1}{7}$
	Full brother or brothers	$\frac{2}{6}$ (R)		Full sister	$\frac{1}{2} = \frac{3}{6}$ reduced to $\frac{2}{7}$
	Full sister or sisters			Consanguine sister or sisters	$\frac{1}{6}$ reduced to $\frac{1}{7}$
	Uterine brother or sister	$\frac{1}{6}$	Uterine brothers, sisters	$\frac{1}{2} = \frac{3}{6}$ reduced to $\frac{2}{7}$	
266	Mother or true grandmother	$\frac{1}{6}$	270	Mother or true grandmother	$\frac{1}{6}$
	Full brother or brothers	$\frac{2}{6}$ (R)		Full sister	$\frac{1}{2} = \frac{3}{6}$
	Full sister or sisters			Consanguine brother or brothers	$\frac{1}{6}$
	Uterine brothers or sisters or brother and sister	$\frac{1}{2} = \frac{2}{4}$	Uterine brother or sister	$\frac{1}{6}$	
267	Mother or true grandmother	$\frac{1}{6}$	271	Mother or true grandmother	$\frac{1}{6}$
	Full sister	$\frac{1}{2} = \frac{2}{4}$		Full sister	$\frac{1}{2} = \frac{2}{4}$
	Consanguine sister or sister's brother or brothers	$\frac{2}{6}$ (R)		Uterine brother	$\frac{1}{6}$
				Full nephew or consanguine nephew or any residuary Nos 18—25	$\frac{1}{6}$ (R)

* Nos 265, 266 are similar to Nos 246, 247

No	Heirs	Shares	No	Heirs	Shares
272	Mother or true grandmother	$\frac{1}{6}$		Full nephew or consanguine nephew or any residuary Nos 18-25	$\frac{1}{6}$ (R)
	Full sisters	$\frac{2}{3} = \frac{4}{6}$			
	Consanguine brothers	$\frac{1}{6}$ (R)		<i>Illustrations of mother together with four heirs</i>	
	Consanguine sisters				
273	Mother or true grandmother	$\frac{1}{4}$	276	Mother or true grandmother	$\frac{1}{6}$
	Consanguine brothers	$\frac{1}{4}$ (R)		Full sister	$\frac{1}{2} = \frac{3}{6}$
	Consanguine sisters			Consanguine sister or sisters	$\frac{1}{6}$ (R)
	Uterine brother or sister	$\frac{1}{6}$		Consanguine brother or brothers	
274	Mother or true grandmother	$\frac{1}{6}$		Uterine brother or sister	$\frac{1}{6}$
	Consanguine brothers	$\frac{2}{3}$ (R)		<i>Illustrations of true grandmother together with one heir</i>	
	Consanguine sisters				
	Uterine brothers, sisters	$\frac{1}{3} = \frac{2}{6}$			
275	Mother or true grandmother	$\frac{1}{6}$	277	True grandmother or true grandmothers	$\frac{1}{6}$
	Consanguine sister	$\frac{1}{2} = \frac{3}{6}$		True grandfather	$\frac{1}{6}$
	Uterine brother or sister	$\frac{1}{6}$			

* In the cases of the mother we have included cases of the grandmother also, here we have simply cited few cases not stated in previous examples

No	Heirs	Shares	No	Heirs	Shares
278	True grand-mother or true grandmothers	$\frac{1}{8}$	283	Full brother or brothers	$\frac{2}{3}$ (R)
	Full brother or brothers or consanguine brother or brothers or any residuary	$\frac{5}{8}$ (R)		Uterine brother or sister	$\frac{1}{6}$
279	True grand-mother or true grandmothers	$\frac{1}{8}$ increased to $\frac{1}{2}$	284	Full brother or brothers	$\frac{2}{3}$ (R)
	Full sister or consanguine sister	$\frac{1}{2} = \frac{3}{6}$ increased to $\frac{1}{2}$		Uterine brothers or sisters or brother and sister	$\frac{1}{3}$
280	True grand-mother or true grandmothers	$\frac{1}{8}$ increased to $\frac{1}{5}$	<i>Illustrations of full brother or brothers together with two heirs</i>		
	Full sisters or consanguine sisters	$\frac{2}{5} = \frac{4}{10}$ increased to $\frac{2}{5}$			
281	True grand-mother or true grandmothers	$\frac{1}{8}$ increased to $\frac{1}{2}$	285	Full brother or brothers Full sister or full sisters	$\frac{5}{6}$
	Uterine brother or sister ¹	$\frac{1}{8}$ increased to $\frac{1}{2}$		Uterine brother or sister	$\frac{1}{6}$
282	<i>Illustrations of brother together with one heir</i>		286	Full brother or brothers Full sister or sisters	$\frac{2}{3}$
	Full brother	$\frac{2}{3}$		Uterine brothers or sisters or brother and sister	$\frac{1}{3}$
283	Full sister	$\frac{1}{3}$	<i>Illustrations of full sister together with one heir</i>		
	Full brother	$\frac{2}{3}$			
284	Full sister	$\frac{1}{3}$	287	Full sister	$\frac{1}{2}$
	Full brother	$\frac{2}{3}$		Consanguine brother or brothers	$\frac{1}{2}$ (R)

¹ If there are uterine brothers, sisters or one brother and sister they would take $\frac{1}{2}$.

No	Heirs	Shares	No	Heirs	Shares
288	Full sister	$\frac{1}{2}$ increased to $\frac{2}{3}$	293	Full sister	$1 = \frac{1}{6}$
	Consanguine sister	$\frac{1}{6}$ increased to $\frac{1}{3}$		Consanguine brother or brothers	$\frac{2}{3}$ (R)
289	Full sister	$1 = \frac{2}{3}$ increased to 1		Uterine brother or sister	$\frac{1}{6}$
	Uterine brother or sister	$\frac{1}{6}$ increased to $\frac{1}{3}$	291	Full sister	$1 = \frac{2}{3}$
290	Full sister	$1 = \frac{2}{3}$ increased to 1		Consanguine brother or brothers	$\frac{1}{3}$ (R)
	Uterine brothers or sisters or brother and sister	$\frac{1}{3} = \frac{2}{3}$ increased to $\frac{2}{3}$		Uterine brothers or sisters or brother and sister	$1 = \frac{1}{3}$
291	Full sister	$\frac{1}{2}$	295	Full sister	$1 = \frac{2}{3}$ increased to $\frac{2}{3}$
	Full nephew or consanguine nephew or any residuary Nos 16-27	$\frac{1}{2}$		Consanguine sister or sisters	$\frac{1}{3}$ increased to $\frac{1}{3}$
				Uterine brother or sister	$\frac{1}{3}$ increased to $\frac{1}{3}$
	<i>Illustrations of full sister together with two heirs</i>		296	Full sister	$1 = \frac{2}{3}$
				Consanguine sister or sisters	$\frac{1}{3}$
				Uterine brothers, sisters	$\frac{1}{3} = \frac{2}{3}$
292	Full sister	$\frac{1}{2}$	297	Full sister	$1 = \frac{2}{3}$
	Consanguine brother or brothers	$\frac{1}{3}$ (R)		Consanguine sister or sisters	$\frac{1}{3}$
	Consanguine sister or sisters			Full nephew or consanguine nephew or any residuary Nos 18-26	$\frac{2}{3}$ (R)

No	Hens	Shares	No	Hens	Shares
298	Full sister	$\frac{1}{2} = \frac{8}{8}$	302	Full sister	$\frac{1}{2} = \frac{8}{8}$
	Uterine brother or sister	$\frac{1}{8}$		Consanguine sisters	$\frac{1}{8}$
	Full nephew or consanguine nephew or any residuary Nos 18-35	$\frac{2}{8}$ (R)		Uterine brother or sister	$\frac{1}{8}$
299	Full sister	$\frac{1}{2} = \frac{8}{8}$		Full nephew or consanguine nephew or any residuary Nos 18-25	$\frac{1}{8}$ (R)
	Uterine brothers, sisters	$\frac{1}{8}$			
	Full nephew or consanguine nephew or any residuary Nos 18-25	$\frac{1}{8}$ (R)		<i>Illustrations of full sisters together with one hen</i>	
			303	Full sisters	$\frac{2}{8} = \frac{4}{8}$
				Consanguine brothers	$\frac{2}{8}$ (R)
	<i>Illustrations of full sister together with three hens</i>		304	Full sisters	$\frac{2}{8} = \frac{4}{8}$ increased to $\frac{4}{8}$
300	Full sister	$\frac{1}{2} = \frac{8}{8}$		Consanguine sisters	$\frac{1}{8}$ increased to $\frac{1}{8}$
	Consanguine sisters } Consanguine brothers }	$\frac{2}{8}$ (R)			
	Uterine brother or sister	$\frac{1}{8}$	305	Full sisters	$\frac{2}{8} = \frac{4}{8}$ increased to $\frac{4}{8}$
301	Full sister	$\frac{1}{2} = \frac{8}{8}$		Uterine brother or sister	$\frac{1}{8}$ increased to $\frac{1}{8}$
	Consanguine brothers } Consanguine sisters }	$\frac{1}{8}$ (R)	306	Full sisters	$\frac{2}{8}$
	Uterine brothers, sisters	$\frac{1}{8} = \frac{2}{8}$		Uterine brothers or sisters or brother and sister	$\frac{1}{8}$

No	Heirs	Shares	No	Heirs	Shares
307	Full sisters	$\frac{2}{3}$		Consanguine brothers	$\frac{1}{3}$ (R)
	Full nephew or consanguine nephew or any residuary Nos 16-25	$\frac{1}{3}$ (R)		Consanguine sisters	
				Uterine brother or sister	$\frac{1}{6}$
	<i>Illustrations of full sisters together with two heirs</i>			<i>Illustrations of consanguine brother together with one heir</i>	
308	Full sisters	$\frac{2}{3}$	312	Consanguine brother	$\frac{1}{2}$
	Consanguine brothers	$\frac{1}{3}$ (R)		Consanguine sister	$\frac{1}{2}$
	Consanguine sisters		313	Consanguine brothers	$\frac{2}{3}$ (R)
309	Full sisters	$\frac{2}{3} = \frac{4}{6}$		Uterine brother or sister	$\frac{1}{3}$
	Consanguine brother	$\frac{1}{6}$ (R)	314	Consanguine brother or brothers	$\frac{2}{3}$ (R)
	Uterine brother or sister	$\frac{1}{6}$		Uterine brothers or sisters or brother and sister	$\frac{1}{3}$
310	Full sisters	$\frac{2}{3} = \frac{4}{6}$			
	Uterine brother or sister	$\frac{1}{6}$		<i>Illustrations of consanguine brother together with two heirs</i>	
	Full nephew or consanguine nephew or any residuary Nos 18-25	$\frac{1}{6}$ (R)	315	Consanguine brothers	$\frac{2}{3}$ (R)
				Consanguine sisters	
	<i>Illustrations of full sisters together with three heirs</i>			Uterine brother or sister	$\frac{1}{3}$
311	Full sisters	$\frac{2}{3} = \frac{4}{6}$			

No	Heirs	Shares	No	Heirs	Shares
316	Consanguine brothers	1	321	Full nephew or consanguine nephew or any residuary Nos 18—25	$\frac{2}{3}$
	Consanguine sisters				
	Uterine brothers or sister and brother and sister	$\frac{1}{2}$		Consanguine sister	$\frac{1}{2} = \frac{1}{3}$
			Uterine brother and sister or uterine brothers, or sisters	$\frac{1}{2} = \frac{2}{3}$	
317	<i>Illustration of consanguine sister together with one heir</i>			Full nephew or consanguine nephew or any residuary Nos 18—25	$\frac{1}{2}$ (R)
	Consanguine sister	$\frac{1}{2} = \frac{2}{3}$ increased to $\frac{1}{2}$			
	Uterine brother or sister	$\frac{1}{2}$ increased to $\frac{1}{2}$			
318	Consanguine sister	$\frac{1}{2} = \frac{2}{3}$ increased to $\frac{2}{3}$	322	<i>Illustration of consanguine sisters together with one heir</i>	
	Uterine brothers or sisters or brother and sister	$\frac{1}{2} = \frac{2}{3}$ increased to $\frac{2}{3}$		Consanguine sisters	$\frac{2}{3} = \frac{1}{2}$ increased to $\frac{2}{3}$
319	Consanguine sister	$\frac{1}{2}$	323	Uterine brother or sister	$\frac{1}{2}$ increased to $\frac{1}{2}$
	Full nephew or consanguine nephew or any residuary Nos 18—25	$\frac{1}{2}$ (R)		Consanguine sisters	$\frac{2}{3}$
				Uterine brothers or sisters or uterine brother and sister	$\frac{1}{2}$
320	<i>Illustrations of consanguine sister together with two heirs</i>			Consanguine sisters	$\frac{2}{3}$
	Consanguine sister	$\frac{1}{2} = \frac{2}{3}$		Full nephew or consanguine nephew or any residuary Nos 18—25	$\frac{1}{2}$
	Uterine brother or sister	$\frac{1}{2}$			

No	Heirs	Shares	No	Heirs	Shares
	<i>Illustration of consanguine sisters together with two heirs</i>			<i>Illustrations of uterine brother or sister</i>	
324	Consanguine sisters	$\frac{4}{5}$	125	Uterine brother or sister	$\frac{1}{2}$
	Uterine brother or sister	$\frac{1}{2}$		Full nephew or consanguine nephew or any residuary Nos 18—25	$\frac{1}{6}$ (R)
	Full nephew or consanguine nephew or any residuary Nos 18—25	$\frac{2}{3}$ (R)	126	Uterine brothers or sisters or brother and sister	$\frac{1}{2}$
				Full nephew or consanguine nephew or any residuary Nos 18—25	$\frac{1}{3}$ (R)

CHART I
SHARERS WITH SHARERS

The Chart indicates what share a sharer mentioned in the top column takes when together with any other sharer mentioned in the left-hand column

Sharers with sharers	Daughter	Daughters	Son's daughter	Son's daughters	Mother	True grandmother	Full sister	Full sisters	Consanguine sister	Consanguine sisters	Uterine brother or sister	Uterine brothers or sisters	Husband	Wife
When with	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Daughter	$\frac{3}{8}$ to-gether	$\frac{3}{8}$ to-gether	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	R	R	R	R	Excd	Excd	$\frac{1}{4}$	$\frac{1}{8}$
2 Daughters	$\frac{3}{8}$ to-gether	$\frac{8}{8}$ to-gether	Excd	Excd	$\frac{1}{2}$	$\frac{1}{2}$	R	R	R	R	Excd	Excd	$\frac{1}{4}$	$\frac{1}{8}$
3 Son's daughter	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{4}$ to-gether	$\frac{2}{3}$ to-gether	$\frac{1}{2}$	$\frac{1}{2}$	R	R	R	R	Excd	Excd	$\frac{1}{4}$	$\frac{1}{8}$
4 Son's daughters	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{3}{4}$ to-gether	$\frac{1}{2}$	$\frac{1}{2}$	R	R	R	R	Excd	Excd	$\frac{1}{4}$	$\frac{1}{8}$

[illegible]

R = Residue
Excl = Excluded

[illegible]

CHART III

RESIDUARIES WITH SHARERS

The Chart indicates what share is taken by a residuary mentioned in the left-hand column when together with a sharer mentioned in the top column

[illegible]

	$\frac{1}{2}R$	$\frac{1}{4}h$	$\frac{1}{2}R$	$\frac{1}{2}R$	$\frac{1}{2}R$	All	All	All	All	All	$\frac{1}{2}R$	$\frac{1}{2}R$
4 True grandfather	$\frac{1}{2}R$	$\frac{1}{4}h$	$\frac{1}{2}R$	$\frac{1}{2}R$	$\frac{1}{2}R$						$\frac{1}{2}R$	$\frac{1}{2}R$
5 Full brother	$\frac{1}{2}R$	$\frac{1}{4}R$	$\frac{1}{2}R$	$\frac{1}{2}R$	$\frac{1}{2}R$	1 2 1 2	"				$\frac{1}{2}R$	$\frac{1}{2}R$
6 Consanguine brother	$\frac{1}{2}R$	$\frac{1}{4}R$	$\frac{1}{2}R$	$\frac{1}{2}R$	$\frac{1}{2}R$	$\frac{1}{2}R$	1 2	$\frac{1}{2}R$			$\frac{1}{2}R$	$\frac{1}{2}R$
7 Full brother's son	$\frac{1}{2}R$	$\frac{1}{4}R$	$\frac{1}{2}R$	$\frac{1}{4}R$	$\frac{1}{2}R$	$\frac{1}{2}R$	$\frac{1}{4}R$	$\frac{1}{2}R$	$\frac{1}{2}R$		$\frac{1}{2}h$	$\frac{1}{2}R$
8 Consanguine brother's son	$\frac{1}{2}R$	$\frac{1}{4}R$	$\frac{1}{2}R$	$\frac{1}{4}R$	$\frac{1}{2}R$	$\frac{1}{2}R$	$\frac{1}{4}R$	$\frac{1}{2}R$	$\frac{1}{2}R$		$\frac{1}{2}R$	$\frac{1}{2}R$
9 Full paternal uncle	$\frac{1}{2}R$	$\frac{1}{4}R$	$\frac{1}{2}R$	$\frac{1}{2}R$	$\frac{1}{2}R$			$\frac{1}{4}R$	$\frac{1}{2}R$		$\frac{1}{2}R$	$\frac{1}{4}h$
10 Consanguine paternal uncle	$\frac{1}{2}R$	$\frac{1}{4}R$	$\frac{1}{2}R$	$\frac{1}{4}R$	$\frac{1}{2}R$	$\frac{1}{2}h$	$\frac{1}{4}h$	$\frac{1}{2}R$	$\frac{1}{4}R$		$\frac{1}{2}R$	$\frac{1}{2}R$
11 Full paternal uncle's son	$\frac{1}{2}R$	$\frac{1}{4}R$	$\frac{1}{2}R$	$\frac{1}{4}R$	$\frac{1}{2}R$	$\frac{1}{2}R$	$\frac{1}{4}h$	$\frac{1}{2}R$	$\frac{1}{2}R$		$\frac{1}{2}R$	$\frac{1}{2}R$
12 Consanguine paternal uncle's son	$\frac{1}{2}R$	$\frac{1}{4}R$	$\frac{1}{2}R$	$\frac{1}{4}h$	$\frac{1}{2}R$	$\frac{1}{2}h$	$\frac{1}{4}R$	$\frac{1}{2}R$	$\frac{1}{2}R$		$\frac{1}{2}R$	$\frac{1}{2}R$

R=Residue

1 2=Double share to a male heir and a single share to a female heir Mat = Maternal Pat = Paternal

CHART IV
RESIDUARIES WITH RESIDUARIES

The Chart indicates what share a residuary mentioned in the top column takes when together with a residuary mentioned in the left-hand column

Serial Number	Residaries with residaries	When with	Son	Son's son	Father	True grandfather	Full brother	Consanguine brother	Full brother's son	Consanguine brother's son	Full paternal uncle	Consanguine paternal uncle	Full paternal uncle's son	Consanguine paternal uncle's son
1	Son	When with	Share to-together	Exclud	1/2	1/2	Exclud	Exclud	Exclud	Exclud	Exclud	Exclud	Exclud	Exclud
2	Son's son		All	Share to-together	1/2	1/2	"	"	"	"	"	"	"	"
3	Father		1/2 R	1/2 R	1/2	1/2	"	"	"	"	"	"	"	"
4	True grandfather		1/2 R	1/2 R	All	1/2	"	"	"	"	"	"	"	"

5	Full brother	All	All		All	Share to-to-gether	"	"	"	"	"	"
6	Consanguine brother	"	"	"	All	Share to-to-gether	"	"	"	"	"	"
7	Full brother's son	"	"	"	All	Share to-to-gether	"	"	"	"	"	"
8	Consanguine brother's son	"	"	"	"	Share to-to-gether	"	"	"	"	"	"
9	Full paternal uncle	"	"	"	"	All	"	"	Share to-to-gether	"	"	"
10	Consanguine paternal uncle	"	"	"	"	"	"	"	All	Share to-to-gether	"	"
11	Full paternal uncle's son	"	"	"	"	"	"	"	"	Share to-to-gether	"	"
12	Consanguine paternal uncle's son	"	"	"	"	"	"	"	"	All	Share to-to-gether	"

R = Residue Excl'd = Excluded

THE DISTANT KINDRED

The Distant Kindred are those blood relations who are neither sharers nor residuaries. There are four classes of Distant Kindred and their full list may be seen from the Charts V to IX.

- 1 Descendants, Class I
- 2 Ascendants, Class II
- 3 Descendants of parents, Class III.
- 4 Descendants of Ascendants, h h s, Class IV

The first class excludes the second which in turn excludes the third and the latter excludes the fourth class.¹

¹ I have not worked out all cases of combination of the Distant Kindred Classes I, II, III and IV. The Charts V—IX represent what an heir of any class would take when jointly with another heir.

CHART VI
DISTANT KINDRED (CLASS I)

The Chart indicates what share a distant kindred here mentioned in the left hand column takes when together with an heir mentioned in the top column. The distribution is according to Imam Muhammad

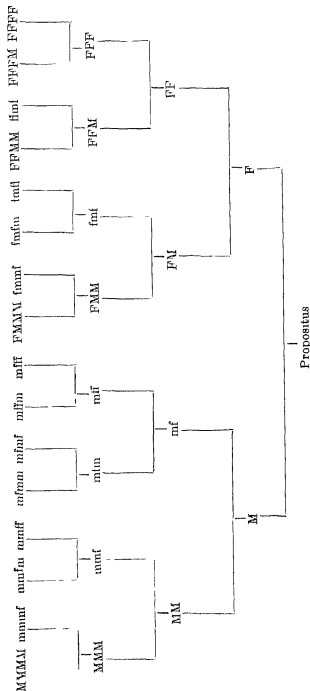
Class I	Daughter's daughter	Daughter's son	Daughter's daughter's daughter	Daughter's daughter's son	Daughter's son's daughter	Daughter's son's son	Son's daughter's daughter	Son's daughter's son
When with	1	2	3	4	5	6	7	8
1 Daughter's daughter	Share together	1 2	All	All	All	All	All	All
2 Daughter's son	1 2	Share together	"	"	"	"	"	"
3 Daughter's daughter's daughter	Excluded	Excluded	Share together	1 2	$\frac{1}{3}$	1 2	Excluded	Excluded

4	Daughter's daughter's son	Excluded	Excluded	1 2	Share to- gether	$\frac{1}{3}$	$\frac{1}{3}$	Excluded	Excluded
5	Daughter's son's daugh- ter	"	"	$\frac{2}{3}$	$\frac{2}{3}$	Share to gether	1 2	"	"
6	Daughter's son's son	"	"	1 2	$\frac{2}{3}$	1 2	Share to- gether	"	"
7	Son's daugh- ter's daughter	"	"	All	All	All	All	Share to- gether	1 2
8	Son's daugh- ter's son	"	"	"	"	"	"	1 2	Share together

1 2—that is, a double share is given to a male heir and a single share to a female heir

THE TABLE OF TRUE AND FALSE GRAND-PARENTS

True grand-parents are indicated in capital letters, all others are false g and p and belong to Distant Kindred, Class II. It will be seen that on the mother's side there is only one true g and mother others are all false grand-parents



NOTE—M or m = Mother F or f = Father

CHART V II
THE DISTANT KINDRED (CLASS II)

The Chart indicates what share a distant hundred hair mentioned in the top column takes when together with an hair mentioned in the left-hand column

	Class II	Mother's father	Mother's mother's father	Father's mother's father	Mother's mother's mother	Mother's father's mother	Mother's father's father	S No.
	when with	1	2	3	4	5		
1	Mother's father	x					Excluded	1
2	Mother's mother's father	All	x				Excluded	2
3	Father's mother's father	All	1/3	x			Excluded	3
4	Mother's father's father	All	1/3	=	x		Excluded	4
5	Mother's father's mother	All	1/3	-	1/3		Excluded	5

CHART V III
THE DISTANT KINDRED (CLASS III)

The Chart indicates what share a distant kindred has mentioned in the top column takes when together with an heir mentioned in the left-hand column. The distribution is according to Imam Muhammad Imam Abu Yusuf differs on several points

Class III	Full sister's daughters	Full sister's son	Consanguine sister's daughter	Consanguine sister's son	Uterine sister's daughter	Uterine sister's son	Full brother's daughter	Consanguine brother's daughter	Uterine brother's daughter	Uterine brother's son
When with	1	2	3	4	5	6	7	8	9	10
1 Full sister's daughter	Share together	1 2	1/4	1/4	1/4	1/4	2/3	Share equally	1/4	1/4
2 Full sister's son	1 2	Share together	1/4	1/4	1/4	1/4	2/3	Share equally	1/4	1/4
3 Consanguine sister's daughter	3/4	3/4	Share equally	1 2	1/4	1/4	All	2/3	1/4	1/4

4	Consanguine sister's son	$\frac{3}{4}$	$\frac{3}{4}$	1 2	Share equally	$\frac{1}{4}$	All	$\frac{2}{3}$	$\frac{1}{4}$	$\frac{1}{4}$
5	Uterine sister's daughter	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	Share equally	1 2	$\frac{5}{6}$	$\frac{5}{6}$	Share Share equally equally
6	Uterine sister's son	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	1 2	Share equally	$\frac{5}{6}$	$\frac{5}{6}$	Share Share equally equally
7	Full brothers daughter	$\frac{1}{3}$	$\frac{1}{3}$	Excluded	Excluded	$\frac{1}{3}$	$\frac{1}{3}$	Share together	$\frac{1}{6}$	$\frac{1}{6}$
8	Consanguine brother's daughter	Share equally	Share equally	1 2	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{6}$	All	Share equally	$\frac{1}{6}$
9	Uterine brothers daughter	$\frac{5}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	Share equally	Share equally	$\frac{5}{6}$	$\frac{5}{6}$	Share Share equally equally
10	Uterine brothers son	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	Share equally	Share equally	$\frac{5}{6}$	$\frac{5}{6}$	Share Share equally equally

1 2=a double share to a male heir and a single share to a female heir

CHART IX
THE DISTANT KINDRED (CLASS IV)

The Chart indicates what share a distant kindred here mentioned in the top column takes when together with an heir mentioned in the left-hand column

Class IV	Father's sister, paternal aunt	Father's consanguine sister	Father's uterine brother	Father's uterine sister	Mother's brother, maternal uncle	Mother's sister, maternal aunt	Mother's consanguine brother	Mother's consanguine sister	Mother's uterine brother	Mother's uterine sister
When with	1	2	3	4	5	6	7	8	9	10
1 Father's sister paternal aunt together	Share together	Excl'd	Excl'd	Excl'd	1/3	1/3	1/3	1/3	1/3	1/3
2 Father's consanguine sister	All	Share together	Excl'd	Excl'd	1/3	1/3	1/3	1/3	1/3	1/3
3 Father's uterine brother	All	All	Share together	1 2	1/3	1/3	1/3	1/3	1/3	1/3
4 Father's uterine sister	All	All	1 2	Share together	1/3	1/3	1/3	1/3	1/3	1/3
5 Mother's brother, maternal uncle	2/3	2/3	2/3	2/3	Share together	1 2	Excl'd	Excl'd	Excl'd	Excl'd

7	Mother's sister maternal aunt	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{2}{3}$	1 2	Share to- gether	Excl'd	Excl'd	Excl'd
8	Mother's con- sanguine brother	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{2}{3}$	All	All	Share to- gether	1 2	Excl'd
9	Mother's con- sanguine sister	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{2}{3}$	All	All	Share to- gether	1 2	Excl'd
10	Mother's uter- ine sister	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{2}{3}$	All	All	All	Share to gether	Share to gether

1 2 = A double share to a male heir and a single share to a female heir

SCIENCE
SECTION I
CHEMISTRY

SYNTHESIS OF SOME OPTICALLY ACTIVE COLOURED COMPOUNDS FROM 1-MEN- THYLDIAZINE AND AROMATIC ALDEHYDES

BY

R. K. KAUL AND JAMUNA DATTA PRASAD

Optically active coloured compounds were prepared by B. Singh (*J. C. S.*, 1922, 121, 1421) by condensing optically active camphoric acid with various aromatic hydroxy compounds. Owing to the intensity of colour of these compounds he could not measure the optical rotation. Sircar and Dutt (*J. C. S.*, 1922, 121, 1283) also prepared optically active dyestuffs by condensing the same camphoric acid with various aromatic hydroxy and amino compounds, but in no case the optical rotation of the compounds was measured.

In the present work 1-menthylhydrazine was prepared and condensed with various aromatic aldehydes in order to give optically active hydrazones which were not so intensely coloured as to interfere with the measurement of optical rotation. The absorption spectra and molecular rotation of the compounds prepared are given at the end of the paper.

PREPARATION OF 1-MENTHYLDIAZINE

This was done in two steps. (1) *Preparation of menthyl chloride*—50 grams of phosphorus pentachloride are covered with dry petroleum ether in a flask and the whole well cooled in ice. 50 grams of menthol are added in small portions to the cooled mixture, no fresh menthol being

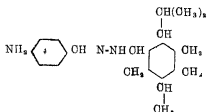
added until the evolution of hydrochloric acid has ceased. The petroleum ether is then distilled off, and the residue distilled with the aid of the fractionating column, crude menthyl chloride passes over at 205° — 215° and it was purified by redistilling several times and lastly the portion distilling between 209° — 210° was used for the preparation of l-menthylhydrazine.

(2) *Preparation of l-menthylhydrazine*—A mixture of menthyl chloride and hydrazine hydrate in molecular proportions was heated over water bath under reflux for about two hours. On cooling the mixture was made alkaline with caustic soda and fractionally distilled. On repeated distillation the quantity that distilled between 235° — 240° was collected for further experiments.

l-Menthylhydrazine thus obtained was condensed with the following aromatic aldehydes: (1) Para-aminobenzaldehyde, (2) ortho-aminobenzaldehyde, (3) ortho-nitrobenzaldehyde, (4) Para-tolylaldehyde, (5) Anisaldehyde, (6) Vanillin, and (7) cinnamicaldehyde.

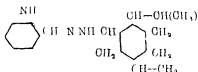
In each case the condensation was carried out by heating under reflux for about two hours a solution in glacial acetic acid of the aldehyde and l-menthylhydrazine in molecular proportions. In each case, on cooling the hydrazone compound got precipitated in beautiful crystals, which were further purified by recrystallization from glacial acetic acid.

(1) Para-aminobenzaldehyde-menthylhydrazone



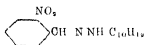
Orange yellow crystals M P 217° Found N=15 %, $\text{C}_{17}\text{H}_{27}\text{N}_3$ requires N=15

(2) Ortho-aminobenzaldehyde-menthylhydrazine



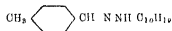
Bright yellow crystals M P 210° Found N = 15.5%,
 $C_{17}H_{27}N_3$ requires N = 15.3%

(3) Ortho-nitrobenzaldehyde-menthylhydrazine



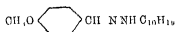
Pale yellow crystals M P 165° Found N = 13.3%,
 $C_{17}H_{25}O_2N_3$ requires N = 13.8%

(4) Para-tolylaldehyde-menthylhydrazine



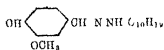
Pale yellow crystals M P 114° Found N = 10.0,
 $C_{18}H_{28}N_2$ requires N = 10.29%

(5) Anisaldehyde-menthylhydrazine



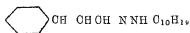
Very light yellow crystals M P 154° Found N = 9.9,
 $C_{18}H_{28}ON_2$ requires N = 9.7%

(6) Vanillin-menthylhydrazine



Yellow crystals M P. 173° Found N = 9.5%, $C_{18}H_{28}O_2N_2$
 requires N = 9.2%

(7) Cinnamicaldehyde-menthylhydrazone



Light golden yellow crystals M P 158° Found N=9.4,
 $\text{C}_{19}\text{H}_{28}\text{N}_2$ requires N=9.8%

Absorption maxima α	Name	Specific rotation	Molecular rotation
4306	Para aminobenzaldehyde-menthylhydrazone	+5.3	+14.46
4920	Ortho-aminobenzaldehyde-menthylhydrazone	-3	-8.19
4025	Ortho-nitrobenzaldehydementhylhydrazone	+7.6	+23
4374	Para-tolylaldehyde-menthylhydrazone	-4.1	-11.15
4030	Anisaldehyde menthylhydrazone	+3.2	+9.21
4025	Vanillin-menthylhydrazone	-1.8	-5.47
4155	Cinnamicaldehyde-menthylhydrazone	-7.8	-22.15

Sodium light was taken as the source of illumination for the measurement of optical rotation. The temperature at which the measurements were taken was 26° , and the solvent used was acetone.

Further work in connection with the change of sign of rotation undergone by the various abovementioned compounds during the process of formation together with the condensation of menthylhydrazine with ketones is being carried on.

FORMATION OF ORGANIC JELLIES (Part I)

BY

SATYA PRAKASH D.Sc.,

Chemistry Department University of Allahabad

With the development of colloid chemistry, our interest in jellies is increasing every day. There are some essential points in which an organic jelly appears to differ from inorganic, and yet the distinction between the two is only arbitrary, and possibly, the mechanism of formation in both the cases is almost the same. Ordinarily, the organic jellies differ from inorganic in the following aspects. The substances which go to form organic jellies exhibit a higher tendency to adsorb stabilising ions. They can take up any charge according to the medium, thus on acid side and alkaline side both, the charge on them is increased. In the case of inorganic jellies the time of setting is generally decreased as the temperature is increased, because the coagulation is more readily affected at higher temperatures. In the case of organic jellies, lowering of the temperature favours the jelly formation. Another important difference between the organic and inorganic jellies is the heat reversibility. Inorganic jellies once dried up by heat do not take up water again and do not swell, whilst gelatin, starch, etc., can re-form jellies after being dried once.

An attempt would be made here to give an account of various synthetic organic jellies. The jellies of natural occurring substances and soaps and dyestuffs would be

described in Part II The following jellies have been treated here

- 1 Dibenzoyl-L-cystine
- 2 Benzoic acetal of sorbitol
- 3 Various Benzo-r-pyrone derivatives
- 4 Azomethine
- 5 Quinine and eucupine salts
- 6 Lithium urate and other uric acid salts
- 7 Mercuri-sulphosalicylic acid and its salts
- 8 Zirconium-sulphosalicylic acid
- 9 Mercury salt of azidothiocarbonic acid
- 10 Camphoryl phenyl thiosemicarbazide
- 11 Mercuri-Benzthiazol methenesulphide-monosulphonate
- 12 Barium malonate

Dibenzoyl-L-cystine Gel

It appears that the jelly of dibenzoyl cystine was prepared for the first time by Brenzinger¹ He states that if the alkaline solution of benzoyl cystine prepared from 2 gm cystine is diluted to three litres before acidification with hydrochloric acid, the resulting mixture would be a rigid gel from which no water can be poured

R A Gortner and W F Hoffman² have made a detailed study of this jelly Their method of preparation of this jelly is as follows 2 gm cystine, prepared from human hair by hydrolysis with hydrochloric acid is suspended in 100 cc water and a sufficient amount of 10 per cent caustic soda is added to dissolve amino acid 10 gm of benzoyl chloride are then added and also the enough additional alkali (in solution) to make a total of 6 gm The mixture is then shaken vigorously until all odour of benzoyl chloride

¹ Z physiol Chem, 16, 537 (1892)

² J Amer Chem Soc, 43, 2189 (1921)

disappears. This mixture upon the addition of hydrochloric acid sets to a stiff gel. This is then broken up by agitation and thrown upon a Buchner funnel and the liquid drained off by a strong suction. After filtering for several hours, a felt of crystals of benzoyl derivative remains on the filter paper. This is washed with water and re-crystallised from somewhat diluted alcohol yielding long silky needles melting at 180-81°. Dibenzoyl cystine is insoluble in water but readily soluble in organic solvents.

0.2 gm of pure benzoyl cystine thus obtained is dissolved in 5 c.c. of 95 per cent alcohol while the contents are kept boiling, hot water is added until a volume of 100 c.c. had been attained. At this point there is a slight opalescence but no evidence of precipitate or gel formation. The solution is then set aside to cool, and in the course of two to three hours, the entire mass sets to a rigid gel comparable to a 5 per cent gelatine gel. The jelly begins to synerise after a few days, and after some weeks, a crystalline deposit is formed.

Jelly of Benzoic Acetal of Sorbitol

The classical work on the acetals of hexahydric alcohols like sorbitol and mannitol is by Meunier.¹ In a number of papers, P. Thomas and Miss M. Sibi² have made detailed investigations of this jelly. The dibenzoic acetal of sorbitol is known to yield a jelly when an aqueous solution of the substance obtained by long boiling is cooled. The formation of the jelly is only expected when the water used is almost neutral, preferably with p_H 8.0-8.5. The aqueous gel thus obtained breaks up on prolonged agitation into flocculent

¹ Compt. Rend., 108, 148 (1889).

² Compt. Rend., 182, 314 (1926), 183, 282 (1926), Rev. gen. Colloid, 8, 68, 105 (1930).

fragments. The incipient crystallisation also occurs when it is covered with acetone or other organic solvent.

Similar to the above hydrogel, Thomas and Sibi¹ have also prepared organogels. The crude benzoic acetal is dissolved in organic solvents at a higher temperature to almost a saturation value. When the solution is allowed to cool, an opalescent isotropic organogel is obtained. The jelly may also be obtained by evaporation of a solution in organic solvents at the ordinary temperature.

Dibenzoic acetal of sorbitol, $C_6H_{12}O_4 (C_6H_5CO)_2$, is supposed to consist of two isomerides, one of which is soluble in water and which in fact gives rise to jellies and the other isomeride is insoluble in water which causes incipient normal crystallisation.

The Jellies of Benzo- γ -pyrone Derivatives

It has been observed by W. Baker and R. Robinson² and further by W. Baker and F. M. Eastwood that various derivatives of benzo- γ -pyrone not only yield colloidal solutions but jellies also. The following substances have been found to give jellies.

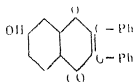
- (a) 7-Hydroxy-2-3 diphenyl benzo- γ -pyrone
- (b) 5, 7 Dihydroxy-3-p-methoxy phenyl-2-styrylbenzo- γ -pyrone
- (c) 7-Hydroxy-3-phenyl-2-styrylbenzo- γ -pyrone
- (d) 5, 7 Dihydroxy-2-3-diphenylbenzo- γ -pyrone
- (e) 5, 7 Dihydroxy-3-phenyl-2-styrylbenzo- γ -pyrone.
- (f) 7-Hydroxy-3-p-methoxy-2-styrylbenzo- γ -pyrone
- (g) 7-Hydroxy-3-phenyl-2-p-methoxyphenyl benzo- γ -pyrone

¹ Loc. Cit.

² J. Chem. Soc., 127, 1981 (1925)

The preparation of these jellies would be described below

(a) *7-Hydroxy-2-3-diphenyl benzoyl pyrone*—Baker and Robinson have described this jelly under the name of 7-hydroxy-3-phenyl flavone



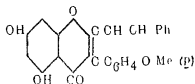
A mixture of 2,4-dihydroxy-phenyl benzyl ketone (20 gm), benzoic anhydride (100 gm) and sodium benzoate (10 gm) is heated on oil-bath at 180° — 190° for 12 hours and the product is dissolved in 250 c.c. alcohol diluted with 50 c.c. water by heating on steam-bath. A solution of 60 gm of KOH dissolved in 100 c.c. water is added and heating on steam-bath continued for 15 minutes, after which 500 c.c. water is added and the phenol is precipitated by saturating the solution with carbon dioxide. It is important to follow these directions strictly to avoid the formation of a thick gel. The crude product is crystallised from 800 c.c. ethyl alcohol.

This substance does not appear to dissolve in cold aqueous caustic potash because of the formation of a gel around each crystal. On heating a greenish yellow solution is produced and this sets on cooling to a clear gel. A 1 per cent solution sets to a stiff gel, whilst even 0.1 per cent solution gives a weak gel with an excess of alkali. The nature of this jelly is very much dependent on the concentration of alkali.

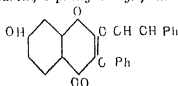
(b) *5,7-Dihydroxy-3-p-methoxyphenyl 2-styrylbenzo- γ -pyrone* Baker and Robinson¹ have given the following

¹ J. Chem. Soc., 128, 2713 (1926)

preparation of this jelly under the name of 5-7-dihydroxy-4'-methoxy-2-styryl isoflavone

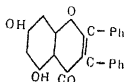


An efficiently stirred mixture of anhydrous 2,4,6-trihydroxy phenol p-methoxybenzyl ketone (10 gm) and cinnamic anhydride (100 gm) is heated on an oil-bath at $180-200^{\circ}$ for two hours, 10 gm powdered sodium cinnamate is then slowly introduced and the heating continued for six hours. The pasty product is scraped out while hot, ground under water, washed with much water, and with aqueous sodium carbonate and dried at a moderate temperature. The chocolate-coloured powder thus obtained is added to 250 c.c. alcohol to which 5 c.c. concentrated sulphuric acid has been added, and decomposition of the excess of cinnamic anhydride effected by gentle warming for an hour-and-a-half followed by boiling for an hour. After cooling the solid is collected and washed with alcohol. It crystallises from 1 litre of glacial acetic acid in bright yellow prisms. This substance appears to be 5-hydroxy-7-cinnamoyloxy-4'-methoxy-2-styryl isoflavone. 10 gm cinnamate thus obtained is treated with a boiling mixture of alcohol (200 c.c.), KOH (4 gm) and water (10 c.c.) for 45 minutes. After this, 200 c.c. of water are introduced and the liquid saturated with carbon dioxide. The bright yellow precipitate is separated and crystallised from alcohol. The solubility of the substance in cold aqueous caustic soda is very slight, but on heating, a viscous orange solution is produced, this froths readily and on cooling deposits colloidal flocks that become crystalline on adding alcohol. It also gives jellies with suitable concentrations of alkali.

(c) 7-Hydroxy-3-phenyl-2-styrylbenzo- γ -pyrone

This substance has been prepared by Baker and Eastwood¹. At first 7-cinnamoyloxy-3-phenyl-2-styrylbenzo- γ -pyrone is prepared by heating a mixture of 2-4 dihydroxy-phenyl benzyl ketone (10 gm), cinnamic anhydride (40 gm) and sodium cinnamate (10 gm) on oil-bath at 170–80°, and finally, at 215° for five hours. The cooled ground product is washed with dilute aqueous caustic soda and cinnamic anhydride decomposed by heating on the steam-bath for an hour with 100 cc alcohol, 20 cc water and 1 cc concentrated sulphuric acid mixture. The solid then obtained on adding water is washed with aqueous caustic soda and crystallised from acetic acid.

One gram of the compound then suspended in 10 cc of alcohol is heated for five minutes with 0.5 gm of caustic potash dissolved in a little water. The solution is then diluted with 10 cc water and the phenolic compound precipitated by saturation with carbon dioxide. It is crystallised from alcohol in pale yellow needles. It dissolves in hot dilute NaOH to a bright yellow solution which sets to a gel on cooling and finally deposits very fine hair-like growths.

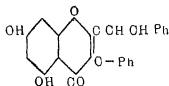
(d) 5,7-Dihydroxy-2,3-diphenylbenzo- γ -pyrone

For the preparation of this substance, 20 gm of anhydrous 2,4,6-trihydroxyphenyl benzyl ketone, 20 gm. benzoic

¹ Ibid, 131, 2897 (1929)

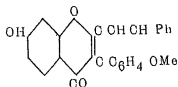
anhydride, and 10 gm sodium benzoate are stirred and heated at $180-90^{\circ}$ for ten hours. The product is hydrolysed by heating with 200 cc alcohol and a solution of 60 gm KOH in 120 cc water for half an hour and after addition of 400 cc of water the phenolic compound is isolated. It is re-crystallised from glacial acetic acid. The substance dissolves in dilute caustic soda only on being heated and gives a pale yellow solution, which sets to a clear rigid jelly on cooling.

(e) 5, 7 Dihydroxy-3-phenyl-2-styrylbenzo- γ -pyrone



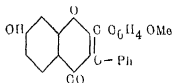
This compound was prepared by Baker and Eastwood from 2, 4, 6-trihydroxyphenyl benzyl ketone (10 gm) by the action of cinnamic anhydride and sodium cinnamate in the manner described for the preparation of 5, 7 dihydroxy-3-p-methoxy phenyl-2-styryl benzo- γ -pyrone. It crystallises in yellow prisms from glacial acetic acid. The orange-yellow solution in hot dilute caustic soda sets to a gel on cooling.

(f) 7-Hydroxy-3-p-methoxyphenyl-2-styryl benzo- γ -pyrone



Baker and Eastwood prepared it from 2, 4 dihydroxy phenyl p-methoxy benzyl ketone by the action of cinnamic anhydride and sodium cinnamate. It dissolves in aqueous caustic soda only on heating to a yellow solution which sets to a jelly on cooling.

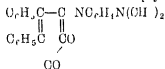
(g) 7-Hydroxy-3-phenyl-3-p-methoxyphenyl benzo-γ-pyrone



2.4 Dihydroxy phenyl benzyl ketone (2 gm), anisic anhydride (10 gm) and anhydrous sodium anisate (2 gm) are heated and stirred at 180° for six hours. The product is hydrolysed with aqueous alcoholic caustic potash and the phenolic compound is isolated by means of carbon dioxide. It crystallises from alcohol in faint yellow needles. It is soluble in hot dilute caustic soda and pale yellow solution sets to a gel on cooling.

Azomethine Jelly

Ruhemann and Naunton¹ obtained by the condensation of *p*-nitrosodimethyl aniline with diphenyl cyclopentenone, a substance named 5-dimethylamino-anilo-3,4-diphenyl cyclopentene-1,2-dione of the following constitution, which was later known as monoazomethine or simply as azomethine —



It is solid at ordinary temperature and occurs either as orange-coloured needles or as small dark red plates, the former separate from dilute solutions and the latter from concentrated solutions in absolute alcohol.

These authors also observed that "If a little water is added to the hot alcoholic solution, no crystals separate on cooling, but the whole sets to a transparent jelly which according to concentration is yellow or yellowish red. This gel when kept at the ordinary temperature gradually liquefies,

¹ J. Chem. Soc., 101, 42 (1912)

and in the course of one or two days, completely disappears, with separation from the resulting solution of azomethine in orange needles" It has also been shown that the substituted azomethines do not give jellies

W B Hardy¹ has made detailed investigations of this jelly He has shown that water is not essential for the formation of this jelly In alcohol absolutely free from water, crystals of dried azomethine were added and the solution made by heat but without boiling In three minutes, the solution was poured off the remaining crystals into another dry quartz tube and placed in a freezing mixture of ice and salt It at once set to a firm gel

Also, when the solution saturated at the boiling point of ether had been concentrated to $\frac{1}{3}$ its volume, it was placed in the freezing mixture, when the mass set to a jelly Carbon tetrachloride has been considered as the most suitable solvent A solution in it also gave a firm gel in a freezing mixture even in the absence of any trace of water Similarly, the jellies have been obtained by freezing its solution in acetaldehyde, acetone, carbon disulphide and glacial acetic acid

All the gels examined by Hardy liquefy on standing with deposition of crystals The change occurs at 15° in a few minutes from an ether gel, a few hours from gels of absolute alcohol or aldehyde, and in some days from carbon tetrachloride gel The presence of water delays the liquefaction of the gel, *i.e.*, the gels of aldehyde-water or alcohol-water persist for some days At temperatures below 5° the gels change only slowly

These jellies are heat reversible At higher temperatures the gel melts and will set again on cooling The jellies cannot be obtained at every temperature Above a certain temperature the gelation does not occur at all, only

¹ Proc Roy Soc, A, 87, 29 (1912)

direct crystallisation occurs. This limiting temperature rises as the concentration increases. In ordinary alcohol, the jellies are formed within 5° to 35°.

The Jellies of Quinine and Eucupine Salts

These jellies have been studied for the first time by P. Rona and M. Takata.¹ They have found that the range of variations of conditions for quinine is very small, 1.5 c.c. of 1 per cent quinine hydrochloride with three c.c. of M/3 phosphate mixture of pH 6.85 giving a stiff gel which crystallised after 5–10 minutes. In case of eucupine, gels of considerable stability are obtained. Gel-formation depends on the pH , values above 4.5 being inimical, on the particular buffering solution used and on the concentration of the eucupine solution. They have followed the course of gelation by change of viscosity, surface tension and conductivity measurements. The gels are reversible and are also suitable for Liesegang ring formation.

P. Rona and W. B. Meyer² have also studied the behaviour of eucupine and uric acid gels during dialysis. Eucupine dihydrochloride, $C_{24}H_{34}O_2N_2 \cdot 2HCl$, $2H_2O$, forms a true solution and eucupine acetate gel are 60 per cent colloidal and the rest in true solution.

P. Thomas and Miss M. Sibi³ prepared gels by mixing solutions of hydrochlorides of quinine, optoquin, or eucupine (isoamyl hydrocupreine) with saturated sodium acetate solution. They found that these gels deposit long, fine, hair-like crystals after 15 minutes, several hours and some months respectively, thus eucupine acetate gives the most stable gel. The deposited crystals are again transformed

¹ Biochem. Z., **134**, 97 (1922)

² Ibid., **143**, 161 (1923)

³ Compt. Rend., **189**, 292 (1929)

to colloidal state on warming and, again, the gels of unchanged properties are formed

Lithium Urate Jellies

H. Schade and E. Boden¹ made the following observations regarding the uric acid and its salts. If uric acid is suspended in boiling water, and alkali is then added very slowly until the mixture is just alkaline to phenolphthalein, the acid appears to pass into solution. The jellies can be obtained from this solution by one of the following methods (a) by the addition of concentrated sodium chloride solution, (b) by the addition of other salt solutions, such as ammonium sulphate which are ordinarily employed for the precipitation of colloids, (c) by the addition of alcohol, and (d) by rapid cooling.

They have also observed that the same phenomenon can be produced when the acid is neutralised by ammonia, lithium, sodium and potassium hydroxides, by the alkaline earths and even ferric hydroxide. According to these authors, the colloid appears to be supersaturated solution in which the uric acid forms an adsorption compound with alkali which causes it to retain the colloidal form and this adsorption compound appears to be a preliminary stage in the formation of true crystalline compound. In another paper,² Schade regards the colloidal solution as a labile system from which the uric acid gel and finally, crystalline uric acid are formed. The optimum stability is at pH 6.0. The views of these authors have been criticised by L. Lichtwitz,³ for reply of which, see Schade and Boden⁴

¹ *Zeitsch Physiol Chem*, **83**, 347 (1913)

² *Zeitsch Klin Med*, **93**, 1 (1922)

³ *Zeitsch Physiol Chem*, **84**, 416 (1913)

⁴ *Ibid*, **86**, 238 (1913)

E. Keeser and H. Zocher¹ made a detailed investigation of lithium urate jellies. They have shown that the jelly-forming urates belong to the class of electrolyte colloids and possess properties similar to soaps and allied substances. It has been observed by them that these jellies on microscopic examination show the presence of long optically anisotropic, negatively doubly refracting jelly particles and also of radial structures which extend into the rest of the jelly mass. They have also found that the addition of methylene blue produces a dichroic coloration and the structure becomes fibrous. The dispersion of the double refraction is abnormal. The long structure of the particles cannot be confirmed by ultramicroscopic examination because of their size.

The solutions of urates cannot be obtained in a viscous state like the anisotropic sols of vanadium pentoxide and benzopurpurin, neither do the urate solutions show streaming double refraction nor magnetic double refraction.

Before lithium urate solutions pass into jellies, they become turbid, and after the jelly has formed, the turbidity for the most part disappears. It is suggested that the turbidity is due to the droplets formed by an unmixing of the solution. Mechanically effected changes in the jellies are irreversible, that is, after displacement the jelly does not resume the original form when the displacing force is removed. The residue obtained by subjecting the jellies to pressure shows but slight swelling power.

The rigidity of the jellies increases with increasing concentration of the solution of lithium urate from which they are formed. The rigidity of jellies of constant composition increases with increasing addition of a lithium salt and the transformation into the crystalline condition takes place, more slowly the more rigid the jelly. In all cases,

¹ Koll. Chem. Beih., 17, 189 (1923)

crystallisation commences at a number of isolated but equally distributed points throughout the jelly mass

The addition of non-electrolytes such as urea, sugar, glycerol or alcohols reduces the rigidity of all the gels increasingly with increasing concentration and retards the crystallisation generally. Urea is exceptional, inasmuch as it accelerates the crystallisation. Protective colloids are without effect on the jellies.

Lithium urate is a negatively charged colloid. The residue obtained by drying the jellies is colloidal in nature, and has the power of adsorbing gases.

The stability of lithium urate sols has been recently studied by the author¹ from the view-point of conductivity and coagulation results. The sols of lithium urate were prepared by suspending 2 gm of uric acid in 100 cc water, to which a drop of phenolphthalein was added. The solution was warmed to 80—90° when lithium carbonate in very small quantities was added till a faint pink colour just appeared. The sols thus prepared generally precipitate out within 24 hours, but give fine transparent jellies when fresh on addition of potassium chloride. After keeping the sols for 5 hours, the jelly-forming tendency disappears and the coagulum obtained is crystalline.

The ageing of the lithium urate sol is always accompanied by a decrease in electric conductivity, the greater the alkali concentration, the slower is the change. But pH of the system always increases on ageing. The abnormal conductivities support the view of Schade and Boden or Rona and Meyer that the colloid appears to be supersaturated uric acid with an adsorption compound with the alkali. The sol behaves as a lyophobic one and its jellies markedly differ from those obtained from lyophilic sols.

¹ Prakash, *J Indian Chem Soc*, 10, 35 (1933)

Mercuri-sulphosaheylie Acid Jelly

In a patent communication,¹ it has been mentioned that when 5-sulphosaheylie acid is treated with freshly prepared mercuric oxide, mercuri-sulphosaheylie acid is obtained. It forms colourless crystals which are readily soluble in water, but the solution obtained is colloidal and viscous.

Wo Ostwald and Mertens² observed that the course of mercuriation of sulphosaheylie acid by mercuric oxide gives rise to stiff hydrogels. But if the mixture is stirred, a sudden fall in viscosity takes place after 24 hours at ordinary temperatures. From the study of viscosity under various conditions these authors have distinguished between two sorts of gels, α and β . The effects of concentration, temperature, and pressure on the viscosity of solutions of these gels were compared and they found that the β gels are characterised by a sudden rise or fall in viscosity.

One interesting thing, these authors observed is that when mercuri-sulphosaheylie acid is treated with sodium chloride the colloidal phase of these solutions at once disappears. They think that mercuri-sulphosaheylie acid on treatment with sodium chloride gives rise to a crystalline compound which is probably sodium-3-chloromercuri-5-sulphosaheylate. According to them this is the characteristic of gel. The dissolution of the colloidal phase also occurs by the following anions Cl' , BR' , CN' , CNS' . Since equivalent weights are required, this they regard as true chemical combination. However, if the colloidal solution is treated with the following anions, the system gains in viscosity sulphate, citrate, oxalate, nitrate and chlorate.

¹ Saccharin-Fabrik Aktiengesellschaft vorm Fahlberg List and Co, D R P 321700, Chem Zentral, 1920, iv, 282

² Koll Chem Beih. 23, 242 (1926)

S Berkmann and H Zocher¹ have studied anisotropy and double refraction of mercuri-sulphosalicylates

The potassium salt is characterised by the turbidity which appears on shaking the sol, the same change occurs in the sodium salt when it is kept for some months. According to these authors, the particles of the turbid sols are thread like. The anisotropy caused by mechanical stirring differs from other cases in that the least force which produces strong double refraction which disappears immediately on cessation of the movement. However, the gels obtained at higher concentrations are permanently doubly refractive. According to anisotropy, the alkali salts are in the following series $\text{Li} > \text{NH}_4 > \text{Na} > \text{K}$. The double refraction decreases at higher temperatures, and also on ageing, but it is increased on the addition of colouring matter.

In a communication, S Prakash and N R Dhai² have studied the conditions of formation of mercuri-sulphosalicylic acid jelly. When freshly precipitated mercuric oxide is dissolved in sulphosalicylic acid solution, perfectly transparent jellies are obtained within 24 hours, if the concentration of mercuric oxide is regulated. These jellies are perfectly stable and do not undergo marked syneresis. With higher concentrations of mercuric oxide, opaque jellies are produced. The jellies of mercuri-sulphosalicylic acid are heat reversible. On being dried on a water-bath, a white powder is obtained and this gives a viscous sol when shaken with water, and when the concentration is suitable, sets to a transparent or translucent jelly. 15 mols of mercuric oxide were dissolved in 1 mol of sulphosalicylic acid and the mixture was dried on a water-bath. The powder of mercuri-sulphosalicylic acid sets to jellies.

¹ Kolloid Z., 42, 309, 322 (1927)

² J Indian Chem Soc., 7, 367 (1930)

when dissolved in water in proper concentration is shown in the following table

Total volume=5 c.c.	
Mercuri-sulpho-salicylic acid	Observations
0.1 gm	No jelly within 24 hours
0.3 gm	No jelly within 24 hours
0.5 gm	Transparent jellies within 40 minutes
0.7 gm	Transparent jelly in 20 minutes
0.9 gm	Turbid jelly in 10 minutes

Most of these jellies are transparent but they are not uniform because it becomes very difficult to get a clear homogeneous solution of mercuri-sulphosalicylic acid at such concentrations. Like soap jellies the jellies of mercuri-sulphosalicylic acid so prepared melt on heating and again set on cooling as is shown in the following table

Total volume=5 c.c.		
Mercuri-sulpho-salicylic acid	Time of setting	Time of setting after once being melted and cooled
0.5 gm	40 minutes	15 minutes
0.7 gm	20	2
0.9 gm	10	Instantaneous setting

It will be seen from the above table that the time of setting of the jelly when once melted is much less than the original setting time.

The sodium salt of mercuri-sulphosalicylic acid is prepared by adding 1 mol of sodium hydroxide to 1 mol of mercuri-sulphosalicylic acid. If to a solution of mercuri-sulphosalicylic acid, the requisite amount of sodium hydroxide is added, and the mixture dried on a water-bath, a white powder is obtained. It has been observed that this white powder of sodium mercuri-sulphosalicylate loses its

power of setting to a jelly when re-dissolved in water. In this respect it appears to be heat irreversible and differs from the original mercuri sulphosalicylic acid. All concentrations between 0.1 gm to 0.6 gm of this sodium salt in 5 c.c. total volume have been tried but no jelly could be obtained with this substance.

The jellies of the sodium salt can be obtained by adding the calculated amount of sodium hydroxide to mercuri-sulphosalicylic acid, when the concentration is suitable. The comparative results for the time of setting of the original acid jelly and also its sodium salt are given in the following table.

Total volume=5 c.c.

For the preparation of sodium salt, for each 0.1 gm of mercuri sulphosalicylic acid, 0.116 c.c. of 2.08 N sodium hydroxide has been used.

Mercuri-sulphosalicylic acid	Time of setting for the acid jelly	Time of setting for the sodium-salt jelly
0.1 gm	No jelly in 24 hours	No jelly in 24 hours
0.3 gm	" " " " "	10 minutes
0.5 gm	40 minutes	8 "
0.7 gm	20 "	5 "

The results recorded in the above table show that the sodium salt more readily sets to jelly than the original acid of the same concentration. However, it has been observed that the jellies of the sodium salt are more opaque than the corresponding acid jellies. It clearly shows that in the sodium salt the agglomeration tendency of the particles is more prominent than the hydration tendency, and this is probably the reason why once dried, the sodium salt does not set when re-dissolved in water. The jellies of the sodium salt also melt when heated and reset on cooling.

Total volume=5 c.c.		
Amount of mercuri- sulpho-sali- cyclic acid in salt jelly	Time of setting of the sodium jelly	Time of setting after once being melted and cooled
0.3 gm	10 minutes	20 minutes
0.5 gm	8 "	11 "
0.7 gm	5 "	5 "

The above table shows that the time of setting of the jelly when once melted is greater than the original setting time. This also shows that in contrast to acid jellies, the hydration tendency of the sodium salt particles is much less, as was also seen from the heat irreversibility of the sodium salt jelly.

For the preparation of these acid or salt jellies, a sufficiently high concentration of mercuri sulphosalicylic acid is required. But the jellies so prepared are very stable and do not exhibit marked syneresis. However, more dilute jellies can be obtained if the colloidal solution of the mercuri-sulphosalicylic acid is coagulated by electrolytes.

In the preparation of the following jellies 4 c.c. of 1 per cent solution of mercuri-sulphosalicylic acid was used, and the total volume was made to 5 c.c. in all the cases.

<i>Electrolyte</i>	<i>Observation</i>
N-potassium nitrate	
0.3 c.c.	Transparent opalescent jelly in 5 minutes
0.5 c.c.	Translucent jelly in 2 minutes, soon synerising
N-potassium sulphate	
0.2	Transparent jelly in 1 hour
0.3	" " " 40 minutes
0.4	" " " 2 "
0.6	Opalescent " " 1 "
0.8	" " " 1 "
1.0	Translucent " immediately which soon undergoes syneresis
N/10 barium nitrate	

<i>Electrolyte</i>	<i>Observation</i>
N/10 barium nitrate	
0.2 c.c.	No jelly
0.3	Opaque jelly in 1 minute, soon synerising
0.5	Opaque jelly immediately, soon synerising

When to the solution of mercuri-sulphosalicylic acid, potassium, lithium or barium chloride is added, the dissolution of the colloidal phase appears to occur and a clear solution which is less viscous than the original sol is obtained which does not coagulate on adding concentrated solutions of potassium sulphate or barium nitrate.

The sodium salt of mercuri-sulphosalicylic acid yields a negatively charged sol which sets to a jelly on the addition of electrolytes. To 1 gram of mercuri-sulphosalicylic acid were added 1.16 c.c. of 2.08 N sodium hydroxide solution, and the total volume was made up to 100 c.c. For the preparation of the jellies of this sodium mercuri-sulphosalicylate, 4 c.c. of the solution were taken each time, and varying quantities of potassium sulphate or barium nitrate were added, the total volume was kept 5 c.c. in each case. The results are recorded below.

<i>Electrolyte</i>	<i>Observations</i>
N-potassium sulphate	
0.2 c.c.	Translucent jelly in 10 minutes
0.3	Do do 6 do
0.4	Do do 3 do
0.6	Do do 3 do
1.0	Opaque precipitate
N-10 barium nitrate	
0.05	No jelly
0.1	Translucent jelly after 24 hours
0.2	Precipitate in 24 hours No jelly
0.3	Opaque loose jelly in $\frac{1}{2}$ hour, soon synerising

Comparing the results of this table with those of the previous one on the acid jellies, it will be seen that at the same concentration of the jelly and the coagulating electrolyte, the time of setting for the acid jelly is much greater than for the sodium salt jelly. The jellies of both the acid and the salt are opalescent and undergo marked syneresis. They are not so stable as those prepared without the addition of electrolytes. The colloidal solution of sodium salt also undergoes dissolution when chloride ions are added to it.

In a paper (*loc cit*), Wo Ostwald and Mertens have observed that Cl' , Br' , NC' , and CNS' ions exert "dissolving" influence on sols of mercuri sulphosalicylic acid derivatives, and they assume a true chemical combination with the formation of a compound of the type sodium-3-chloromercuri 5-sulphosalicylate when mercuri-sulphosalicylic acid is mixed with sodium chloride. Such examples of chlorination by the mere addition of sodium chloride are not familiar in organic chemistry. What appears to be more probable is that the addition of chloride ions displaces the mercury of sulphosalicylic derivatives. This view is further supported by the fact that the mercuriation of sulphosalicylic acid is far easily conducted by freshly precipitated mercuric oxide free from chloride ions than by mercuric chloride. The crystalline compound, decomposing at 240°C ., which Wo Ostwald takes to be a chloro-mercuri compound appears to be a mixture of mercuric chloride and sodium sulphosalicylate.

Prakash and Dhar¹ have also studied the changes in viscosity during the process of gelation of this jelly. The author has also investigated the influence of temperature on the setting of the jelly² and also the changes in extinction

¹ J Indian Chem Soc, 6, 391 (1929)

² Ibid, 9, 191 (1932).

coefficients during the course of jelly formation ¹ Recently, Prakash and Bhargava have studied the magnetic birefringence of the sol quantitatively

Zirconium-sulphosalicylic Acid

The author ² has recently communicated that by careful regulation of the concentrations of zirconium oxychloride, sulphosalicylic acid and water, not only stable colloidal sols zirconium sulphosalicylic acid are obtained, but very transparent glass like hard jellies can also be prepared. A 50% solution of 5-sulphosalicylic acid, $C_6H_3SO_3H \cdot OH \cdot COOH \cdot 2H_2O$, (3.99N) free from sulphate ions, was used. An almost saturated solution of zirconium oxychloride, $ZrOCl_2$, corresponding to 310.68 gm ZrO_2 per litre was found to be very suitable for jelly formation. The following are a few typical concentrations for the preparation of the jellies. Zirconium oxychloride solution used each time was 1 c.c.,

Amount of sulphosalicylic acid	Amount of water	Observation
0.5 c.c.	1.5 c.c.	Transparent jelly in 85 hrs
0.5	2.0	Transparent jelly in 50 hrs
1.5	1.0	Transparent jelly in 60 hrs
2.0	1.0	Transparent jelly in 46 hrs
2.0	1.5	Opalescent jelly in 40 hrs
2.0	2.0	Translucent jelly in 19 hrs
2.0	3.0	Translucent jelly in 10 hrs

The greater the amount of water added to the system, the less is the setting time of the jelly, but the jelly is more opalescent. The jelly is also more readily obtained at a higher temperature but the texture and the fineness of the jelly are markedly spoiled. Some of the best jellies of zirconium sulphosalicylic acid are as transparent as mercuri-sulphosalicylic acid jellies, but on ageing they become com-

¹ J. Phys. Chem. (1932)

² Prakash, Z. anorg. Chem. 215, 249 (1933)

paratively harder. These jellies do not undergo any syneresis but on drying exhibit a peculiar sort of rupture with beautiful pattern of cracks. In presence of monovalent ions like chlorine from KCl, the sol of this acid is markedly stabilised, while in the presence of any sulphate, the coagulation is rapid and a jelly is obtained in a comparatively less time but is more opaque. These jellies are not obtained in neutral or alkaline medium.

Bhaigava and Prakash¹ have also observed that if to the above jelly-forming system, a little of aluminium nitrate or nitric acid be added, the jelly of zirconium sulphosahcyclic acid develops in the course of time a beautiful ruby red colour whilst the transparency is not at all affected. The colour may be due to the formation of aurin type of dye in traces from sulphosahcyclic acid in presence of nitric acid, or to the occlusion of nitrogen oxide fumes in the capillary structure of the jelly. In presence of sodium nitrite, a yellow transparent jelly is obtained.

Mercury Salt of Azidothiocarbonic Acid

F. Sommer² obtained the sodium salt of a azidothiocarbonic acid, $N_3CS_2Na \cdot 4H_2O$ by the interaction of carbon-disulphide and an aqueous solution of sodium azoimide at $40^\circ-50^\circ$, when a pale yellow solution is obtained, which yields colourless prisms on evaporation. This sodium salt on treatment with mercuric chloride yields the corresponding mercuri-salt, which yields colloidal solutions as well as gels if sufficiently concentrated.

Camphoryl phenyl thiosemicarbazide jelly

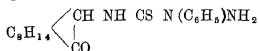
M. O. Forster and T. Jackson³ were the first to prepare camphoryl phenyl thiosemicarbazide. 9 gm of

¹ J Indian Chem Soc 11 (1934)

² Ber, 48, 1833 (1915)

³ J Chem, Soc, 91, 1877 (1907)

camphoryl thiocarbimide, dissolved in 120 c c of ether to which a small quantity of alcohol had been added, were cooled in ice and treated with phenylhydrazine also dissolved in ether. On this treatment, they observed that the liquid changed to a clear stiff jelly, which underwent but slight shrinkage during six hours. This was dissolved in 20—30 c c of hot alcohol and warmed until ether was removed. Thus about 8 gm of the less fusible thiosemicarbazide of the following constitution (M P 183°) were obtained



These authors also made experiments to ascertain the minimum of material which is capable of producing this jelly, and found that if the thiosemicarbazide is first dissolved in a small quantity of hot alcohol and the solution diluted with petroleum, one part in 300 gives a tough transparent jelly which does not liquefy during 24 hours. After this period, however, they observed, the medium gradually became hmpid and the solid separated in well-defined crystals which at first appeared suspended in the jelly.

A detailed study of this jelly had been later on undertaken by E. Hatschek¹. Camphoryl phenyl thiosemicarbazide is easily soluble at ordinary temperature in acetone, but only a little in alcohol or other organic solvents. However, it is pretty soluble in boiling absolute alcohol and also in toluene at 100°. A five per cent solution of the substance in boiling alcohol when allowed to cool rapidly gives a clear gel. The alcogels are very elastic and a two per cent gel closely resembles an agar gel of 0.75 per cent concentration. If the solution in alcohol is only slowly cooled, then the substance separates out in well-formed crystals.

Phenyl thiosemicarbazide is soluble in toluene at 100°, and when it is cooled, whether slowly or rapidly, a clear

¹ Kolloid Z., 11, 158 (1912), 51, 44 (1930)

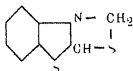
jelly would be obtained, the rate of cooling being without any appreciable influence. The best jellies are obtained at a concentration of 1.5 per cent. The jellies above 2.5 per cent concentration soon exhibit a change in the fact that they become cloudy at certain points, and round these centres, spherical aggregates begin to develop. With 4 to 5 per cent of the substance, the jelly is also obtained, but spherical crystals appear after a time. When these jellies are heated, they undergo melting at a temperature of 35° – 40° , and on cooling they again set to jellies. Some of the jellies have shown the phenomenon of hysteresis also.

The jellies are also similarly obtained in carbon tetrachloride. When a 2 per cent of the substance is dissolved at 60° to 70° and then cooled to room temperature, a clear gel is obtained. The four per cent jellies are turbid. The gel is also obtained by dissolving 0.1 gm. of the substance in 1 c.c. of benzyl alcohol at room temperature and adding 4 c.c. of carbon tetrachloride (the end concentration being 2%). No gels have been obtained in n-hexane, benzol, acetone or benzyl alcohol.

Jelly of Mercuri Benzthiazol methenesulphide monosulphonate

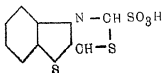
(Doehle's Gel)

According to R. Möhlau and W. Kriehn,¹ when dimethyl aniline is heated with sulphur, a number of benzthiazole derivatives are formed. One of these products is benzthiazol-methenesulphide of the following constitution



¹ Berl. Ber. 21, 60 (1913)

When benzthiazolmethenesulphide is acted upon by ten times its weight of fuming sulphuric acid, it undergoes sulphonation and a part of the base remains unchanged. On sulphonation, a monobasic acid, $C_8H_6NS_2SO_3H$, is



formed, which remains unchanged even if the temperature is raised. The acid is soluble in water and is highly hygroscopic. It is insoluble in organic solvents.

Benzthiazolmethenesulphide monosulphonic acid possesses a remarkable property of forming a mercury salt. When the potassium salt of the sulphonic acid is treated with mercuric chloride, the salt is obtained which gives stiff jellies. For their investigations, W. Doehle and B. Rassow¹ used N/5, N/10, N/50 and N/100 solutions of potassium salt of sulphonic acid and of mercuric chloride. When both these solutions are mixed at the room temperature, at first a yellow solution is obtained which in dilute solutions sets to a stiff gel in the course of 2 to 12 hours according to the concentrations. In concentrated solutions, the jellies are obtained only in a few seconds. When equivalent quantities of mercuric chloride and potassium salt are mixed these authors think that, the jelly-forming mass consists of the normal mercury salt, $(C_8H_6NS_2SO_3)_2Hg$.

The mercury salt is unstable and the jellies sooner or later become cloudy in appearance in consequence of the formation of the basic salt, $Hg(C_8H_6NS_2SO_3)_2HgO$, which separates out in the form of very small crystals. The stability of the jellies increases with the concentration of the mercury salt, and those prepared from N/5 solutions of the

¹ Kolloid Z., 12, 71 (1913)

potassium salt and mercuric chloride can be kept for some time before they begin to exhibit opalescence as a result of the initial precipitation of the basic salt

The colloidal mercuric-salt is coagulated by electrolytes and alcohol, the coagulum being converted into the crystalline basic salt on contact with water. The viscosity of freshly prepared solutions continuously increases with time and also in the presence of salts, especially potassium iodide

Barium Malonate Jelly

F. Flade¹ obtained the jelly of barium malonates in methyl alcoholic solution. Equivalent solutions of butyric and malonic acid in methyl alcohol were mixed, when the jellies were obtained

These jellies have been further studied by H. Zocher and Hans W. Albu². The jellies studied by them contained glycerine up to 90 per cent. An opalescent jelly is obtained when 1 c.c. of 2N malonic acid in methyl alcohol and 2 c.c. of N-barium hydroxide are mixed together with further addition of 6 c.c. of water mixed with methyl alcohol. If no water is used, and all the solutions are prepared in methyl alcohol, the jelly obtained is opaque and it soon breaks up to a white powder. The jellies obtained in methyl alcohol are doubly refractive.

Zocher and Albu's jellies in glycerol can be obtained by mixing 1 c.c. of 2N malonic acid (in methyl alcohol), 2 c.c. of N-barium hydroxide (in methyl alcohol) and 6 c.c. of glycerine-water mixture, containing varying quantities of glycerine. The nature of the jelly depends upon the glycerine content. Some of the jellies are doubly refractive and they also undergo syneresis. All the jellies excepting those which are free from water are thixotropic also

¹ Z. anorg. Chem., 28, 173 (1913)

² Kolloid Z., 46, 33 (1928)

INDUCED OXIDATION OF GLUCOSE IN PRESENCE OF GLUTATHIONE ACTING AS AN INDUCTOR

BY

HARKUMAR PRASAD VARMA,

*Research Scholar, Chemistry Department, University
of Allahabad*

In a previous paper,¹ Dube and Dhar have advanced the view that glucose is appreciably oxidised by passing air in its solution in presence of insulin, which acts as an inductor. This induced oxidation is markedly accelerated in presence of phosphates, cerous and ferrous hydroxides. Insulin itself is capable of oxidation when air is passed in it, but in the presence of glucose, the oxidation of the former is retarded, and the oxidation of insulin induces the oxidation of glucose. Our experiments with sodium carbonate showed that this substance inactivates insulin and therefore, in its presence, there is no increase in the oxidation of glucose due to insulin.

It had been remarked by the authors in the very communication that 'the behaviour of insulin resembles that of glutathione. Glutathione is an auto-oxidisable substance. It oxidises itself by the oxygen of the atmosphere and at the same time induces the oxidation of cell constituents. Harrison² has shown that traces of iron cause a marked acceleration in the auto oxidation of glutathione, and hence the oxidation of tissue components induced by glutathione will also be accelerated by iron'. In this communication, I have undertaken the study of the oxidation of glucose in presence of glutathione and various other inductors as cerous hydroxide and ferrous hydroxide.

¹ J Phys Chem **36**, 444 (1932)

² Biochem J, **18**, 1009 (1924)

Experimental

All the experiments were carried out in diffused daylight as well as in tropical sunlight. In these experiments, a slow current of air was passed through a series of bottles, containing 20 per cent sodium hydroxide solution, barium, and concentrated sulphuric acid to free the air from carbon dioxide and moisture. The carbon dioxide free air was passed through the solution of glucose containing insulin and other substances such as ferrous, or cerous hydroxides, sodium carbonate, sodium bicarbonate, and sodium sulphite. A measured volume of air was passed. A fresh solution of glutathione (0.05 gm) was always used. For the experiments with glutathione, it had been found that this substance also reduces the Fehling's solutions and, therefore, it was destroyed by bromine in dilute solutions before the estimation of sugar. Extra pure glucose of Merck was always used. The volume of the solution oxidised was always made up to 100 c.c. by adding distilled water. 36.5 litres of air were passed in 15 hours.

1 per cent solution of glucose was used

TABLE I
In diffused light
100 c.c. glucose—0.2308 gm CuO

Litres of air passed	Glucose solution	Glutathione	Inductor	Amount of glucose oxidised (gm CuO)	Percentage Oxidation
36.5	100 c.c. (0.2308 gm CuO)		Ce(OH) ₂ 20 c.c.	0.0182	7.9
36.5	do	0.05 gm	do	0.0297	12.9
36.5	100 c.c. (0.2308 gm CuO)		Fe(OH) ₂ 20 c.c.	0.0131	5.7
36.5	do	0.05 gm	do	0.0347	15.0

TABLE I—(Contd)

Litres of air passed	Glucose solution	Glutathione	Inductor	Amount of glucose oxidised (gm CuO)	Percentage Oxidation
36.5	10 c.c. (0.2380 gm CuO)		NaHCO ₃ 0.1 gm	0.0080	3.5
36.5	do		do	0.0192	8.3

The results recorded in this table show that in presence of glutathione, the induced oxidation of glucose by cerous and ferrous hydroxides as well as sodium bicarbonate is markedly increased. However, the reverse behaviour is observed in presence of sodium carbonate and sodium sulphite as is shown below.

TABLE II
In diffused light

Litres of air passed	Glucose solution	Glutathione	Inductor	Amount of glucose oxidised (gm CuO)	Percentage Oxidation
36.5	10 c.c. (0.2308 gm CuO)		Na ₂ CO ₃ 0.1 gm	0.0686	29.7
36.5	do	0.05 gm	do	0.0324	14.0
36.5	do		Na ₂ SO ₃ 0.1 gm	0.0352	15.2
36.5	do	0.05 gm	do	0.0282	12.2

Thus in the case of sodium carbonate and sodium sulphite the results are quite peculiar. There is more oxidation in presence of these substances alone than when glutathione is added along with them. Such results were also obtained with insulin and sodium carbonate by Dube

and Dhai (loc cit), which are difficult to explain. Some results on oxidation of glucose in sunlight are given below.

TABLE III

Litres of air passed	Glucose	Glutathione	Inductor	Amount of glucose oxidised (gm CuO)	Percentage Oxidation
36.5	10 c.c. (0.2308 gm CuO)		NaHCO ₃ 0.1 gm	0.0552	23.5
36.5	do	0.05 gm	do	0.0751	32.5
36.5	do		Na ₂ CO ₃ 0.1 gm	0.0954	41.5
36.5	do	0.05 gm	do	0.0318	13.6

These results show that the percentage of oxidation is much greater in sunlight than in the diffused light of the room. The results recorded in this paper throw much light on the function of glutathione in physiological processes. Its main function is that of an inductor which helps in the metabolism of the foodstuff. Glutathione undergoes auto-oxidation, and this induces further the oxidation of substances like glucose.

Summary

1. Glucose is appreciably oxidised by passing air through solutions of glucose in presence of glutathione. Cerous hydroxide, ferrous hydroxide, and sodium bicarbonate markedly accelerate this induced oxidation of glucose by air in presence of glutathione.

2. Glutathione is an auto-oxidisable substance. In presence of glucose, the oxidation of glutathione is retarded but the oxidation of glutathione induces the oxidation of glucose. Thus is the metabolism facilitated in the body in presence of glutathione.

3. Sodium carbonate and sodium sulphite appear to inactivate glutathione and in their presence, there is a marked decrease in the oxidation of glucose.

**CHEMICAL EXAMINATION OF THE SEEDS OF
ABRUS PRECATORIUS LINN—(PART II)
THE COLOURING MATTER OF THE
SEED-COAT**

BY

NARENDRANATH GHATAK, M Sc ,

*Research Scholar, Chemistry Department, University
of Allahabad*

In a previous paper by the present author (*J Indian Chem Soc* , 1932, 9, 383) the results of chemical examination of the kernels of the seeds of *Abrus precatorius* (scarlet variety) have been recorded. In the present paper the methods of isolation and properties of the red-colouring matter of the seeds have been described. The first attempt towards the isolation of the colouring matter of *Abrus* seeds was made by Sarkar (*Biochem J* , 1914, 8, 281—86), who extracted two colouring matters, yellow and scarlet, by soaking the crushed seed-coat in water and finally separating them with ether. He purified the scarlet-colouring matter by preparing the insoluble copper salt and from a study of some colour reactions concluded it to be a tannin substance. The next reference that "anthocyanin is sometimes developed in the cells of the testa of seeds of *Abrus*" is recorded in Onslow's book (*The Anthocyanin Pigments of Plants*, 1925, p 30).

The above represents all that exist in chemical literature about the colouring matter of *Abrus* seeds and no definite observations have yet been made regarding the

exact nature of its chemical constitution The present author has, however, been able to separate in pure forms a red anthocyanin and gallic acid from the seed-coat of *Abrus precatorius* The methods of isolation and properties of these substances have been described in the experimental part of the paper

Experimental

The seed-coat of *Abrus precatorius* constitutes 30 per cent of the entire seed The inner surface of the seed-coat is yellowish white and gives out a thin inner integument on soaking with water If a portion of the seed-coat, from which the inner integument has been removed, is dipped in neutral ferric chloride solution, the inner side immediately takes up a blue stain and the upper red side is slowly affected This shows the presence of a layer of tannin matter after the inner integument In the next layer is present the red-colouring matter and at the top is a thin cuticle which imparts polish to the red colour of the seed The colouring matter slowly passes into solution when kept soaked in water but the colour of the solution is discharged on standing On addition of acids the solution becomes bright pink red A similar treatment as above with alcohol keeps the colouring matter in the seed-coat unaffected But if some of it is previously treated with water, dried and then treated with alcohol, the colouring matter is readily extracted This proves definitely the presence of a thin cuticle at the top of the seed which is quickly removed by water

In aqueous-acid solutions the colour is readily extracted but concentrated hydrochloric and glacial acetic acids do not dissolve it The pink colour of dilute acid extracts is readily discharged becoming brownish yellow on addition of alkali An aqueous extract of the seed-coat

develops a bluish-black coloration with ferric chloride, which turns bluish-violet on dilution. When the seed-coat is allowed to remain long in aqueous hydrochloric acid, the black spots slowly lose colour becoming pink-red and then brown the other portions turning white. This shows that the black spot of the seed-coat is only a very concentrated form of the red-colouring matter which exists all around.

Extraction of the colouring matter—The seeds of *Abrus precatorius* were partially crushed in a hand-crushing machine when the seed-coat was easily detached from the hard yellow kernels. 400 g of the seed-coat thus obtained was crushed to small pieces and extracted with boiling water in a porcelain dish. After about ten minutes boil the extract, which was of a pale pink colour, was filtered. On addition of a few drops of hydrochloric acid the colour of the extract became deep pink-red. Excess of solid lead acetate was then added and a flocculent bluish-white precipitate was formed which was filtered off. The material was again extracted with fresh quantity of boiling water and precipitation repeated as before. This process was repeated till the seed-coat became almost colourless and the black spots turned brown. The colour of the lead salts of subsequent extracts improved towards blue. The combined lead salt was washed with hot water, and the cake macerated with 500 c c glacial acetic acid in a porcelain mortar. The lead salt of the colouring matter dissolved with a deep pink-red colour. It was filtered and the residue was again taken up with a further quantity of 300 c c of glacial acetic acid. To the total acetic acid extract ether was added till the pink colour of the solution just disappeared. A blue precipitate of the lead salt of the colouring matter was formed. Excess of ether was avoided as it precipitated a white substance. The lead salt was filtered, washed several times with ether and

finally with alcohol to free it from acetic acid. On drying the blue colour of the salt changed to yellowish-green. It was decomposed in ethyl alcohol (98 per cent) suspension with concentrated hydrochloric acid. The alcoholic solution became deep red and lead chloride settled at the bottom. The filtrate was kept with three volumes of ether for 48 hours. The colouring matter settled at the bottom. The mother liquor was decanted off and the residue on washing several times with dry ether was obtained as dark red crusts. It is proposed to designate this substance *abianin* with reference to its properties as an anthocyanin and the generic name of the plant from which it has been obtained.

A portion of the filtrate from the original lead salt was freed from lead and the acetic acid was neutralised with ammonia and concentrated. The solution reduced Fehling's solution, ammoniacal silver nitrate and copper acetate solution in dilute acetic acid. From this solution an osazone was prepared in the usual way and was identified to be glucosazone m.p. 205° .

The filtrate from the glacial acetic acid extract of the original lead salt that was precipitated with ether, was concentrated to about 100 c.c. A thick dirty white precipitate was formed. It was washed free from acetic acid, dried and decomposed in alcoholic suspension with dilute sulphuric acid. The filtrate on complete evaporation of the solvent deposited needle-shaped crystals (4 g.). It was crystallised from hot water and animal charcoal. Small needle-shaped soft silky crystals were obtained which on drying in an oven melted at 262° . This substance on heating with concentrated sulphuric acid produces a purple coloration. Potassium cyanide solution develops a pink colour with the substance which disappears on standing but returns back on shaking with air. Lime water produces a blue coloration with it. The white lead

cent extract of the chloride gives with dilute solution of aluminium chloride a blue colour. On combusting the substance the following results were obtained

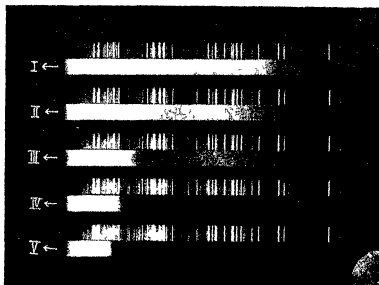
[C, 50.06, 50.12, H, 5.53, 5.41]

Hydrolysis of abranin chloride—0.5 g of the substance was dissolved in dilute hydrochloric acid and warmed with further addition of concentrated hydrochloric acid (making the strength about 10–12 per cent). On allowing it to cool small quantity of dark-red granular powder settled. It was filtered, washed and dried in vacuum desiccator over calcium chloride. It did not melt even on heating to 300° and was the aglucone—abranidin. Small quantity of abranidin that remained in the mother liquor could not be induced to separate from solution. It was, therefore, quantitatively removed by extraction with amyl alcohol. The aqueous solution was neutralised and the osazone of the sugar prepared. The phenylosazone melted at 205° and was identified to be glucosazone.

Abranın picrate—0.5 g of the chloride was dissolved in water and to it was added hot saturated solution of picric acid. The brown solution slowly deposited chocolate-red plates of the picrate along with crystals of picric acid, on spontaneous evaporation of the solvent. The precipitate was dried and washed several times with dry ether to completely remove picric acid. The picrate was soluble in water. It melted at 149–50° after being dried in vacuum desiccator over calcium chloride.

Distribution Number—The distribution number was determined according to the method of Willstätter and Zollinger (Annalen, 1916, 412, 208) using pyridine-free amyl alcohol saturated with an equal volume of 0.5 per cent aqueous hydrochloric acid. 0.01 g of the pigment was dissolved in 50 c.c. of 0.5 per cent aqueous hydrochloric acid. The solution was extracted with 50 c.c. amyl alcohol twice and the distribution numbers were determined with

PLATE I



ABSORPTION SPECTRA PHOTO OF ABRAMIN CHLORIDE IN
METHYL ALCOHOL-HYDROCHLORIC ACID

No	Absorption			
1	Continuous spectrum			
2	Thickness of layer exposed	2.5 mm	516	518—483 491
3	" "	5.0 mm	551	548—486 483
4	" "	10.0 mm	570	569—476 469
5	" "	20.0 mm	579 to the end of the visible region	

comparison of a standard solution of the pigment in amyl alcohol by means of a colorimeter. The first extraction gave the distribution number 11.13 and the second, 10.42. From these results the anthocyanin appears to be a monoglucoside.

Absorption spectra—0.01 g of the pigment was dissolved in 50 c.c. methyl alcohol-hydrochloric acid and the absorption spectra were determined in a constant deviation spectrometer (Adam Hilger). The comparison spectrum that has been taken above the continuous and absorption spectra is that of copper arc. The time of exposures of the continuous and arc spectra was the same. The absorption spectrum consists of one broad band reaching from the yellow to blue. The end of the bigger wavelength of the absorption band is fairly well defined, more so when long columns are examined than when shorter ones are used. The edge of the smaller wavelength of the absorption band is very ill-defined. The absorption spectra photo and the absorption data are shown in the next page.

The author wishes to express his best thanks to Dr. S. Dutt for his kind interest in the work and to the "Kanta Prasad Research Trust" of the Allahabad University for a scholarship which enabled him to take part in the investigation.

METALLIC THORIUM AS A SYNTHETIC REAGENT IN ORGANIC CHEMISTRY

BY

KEDAR NATH GAIND AND SIKHIBHUSHAN DUTT

Since the middle of the nineteenth century, various metals or metallic derivatives have been used in organic synthesis. The earliest amongst them to be utilised for this purpose was potassium, by Frankland and Kolbe¹ in 1848, in the vain hope of preparing free radicals from alkyl nitriles. The use of sodium came immediately after this and it was found to be a better reagent than potassium. Zinc was used by Frankland² in 1853 and also by Frankland and Duppa³ ten years later on. The use of magnesium in organic synthesis was made a classical study by Grignard,⁴ and silver was extensively used by Wislicenus.⁵ Copper was used by Sandmeyer and Gattermann,⁶ but its great value as a synthetic reagent was established in a remarkable series of experiments by Ullmann.⁷ Nickel was used as a catalytic hydrogenating agent by Sabatier

¹ Frankland and Kolbe, *Annalen*, 1848, *65*, 269

² Frankland, *Annalen*, 1853, *85*, 329

³ Frankland and Duppa, *Ditto*, 1863, *126*, 109

⁴ Grignard, *Comp. Rend.* 1900, *130*, 1322

⁵ Wislicenus, *Annalen*, 1869, *149*, 221, *Ber.*, 1869, *2*, 720

⁶ Sandmeyer, *Ber.*, 184, *17*, 1633. Gattermann, 1890, *23*, 1218

⁷ Ullmann, *Ber.*, 1901, *34*, 2174, 1903, *36*, 2383, 1904, *37*, 853, 1905, *38*, 729, 1906, *39*, 1691, 2211

and Sandereens,⁸ aluminium was used successfully by Roy and Dutt⁹ and chromium by Chakrabarti and Dutt.¹⁰ Many of the commoner metals like iron, tin, mercury, arsenic, antimony, etc., have been variously used by a number of investigators in place of the metals already mentioned, with more or less success. Very recently Lal and Dutt¹¹ have made use of a comparatively rare metal like cerium in organic synthesis.

The present investigation is the outcome of an attempt to utilize the very reactive metal thorium in organic synthesis. Even as late as 1920, metallic thorium was more or less a chemical curiosity, and consequently it was beyond the means of an organic chemist to utilize it in synthesis. But in recent years, partly on account of the great development of the gas mantle industry and consequent production of thorium salts on a huge scale and partly due to great improvements in the thermite process of metal manufacture, metallic thorium is now easily available, and the present investigation was undertaken to find out the possibilities of this metal in organic syntheses, particularly in view of the fact that it is a radio-active substance, and as such can be expected of great chemical reactivity.

Experimental

Dry distillation with thorium powder—In these experiments, various organic compounds were submitted to dry distillation with thorium powder in a current of pure dry hydrogen in accordance with the method already

⁸ Sabatier and Sandereens, *Comp. Rend.*, 1901, 132, 201

⁹ Roy and Dutt, *Jour. Ind. Chem. Soc.*, 1928, 5, 103

¹⁰ Chakrabarti and Dutt, *Ditto*, 1928, 5, 517

¹¹ Lal and Dutt, *Ditto*, 1932, 9, 565

described by Roy and Dutt. The results are summarised in the table given below —

Substance	Temperature of distillation	Main product	Yield	By-products
Phenol	470 C	Benzene	46 %	Nil
Catechol	500 570°C	Phenol	52 %	Benzene
Resorcinol	,	Benzene	42 %	Phenol
α naphthol	,	Naphthalene	72 %	Nil
α nitronaphthalene	,	α -naphthylamine	65 %	Naphthalene and ammonia
<i>o</i> Nitraniline		<i>o</i> -phenylenediamine	56 %	Benzene, aniline and ammonia
<i>m</i> -Hydroxy-benzaldehyde	,	Toluene	36 %	Phenol
Salicylic acid		Phenol	55 %	Benzene and CO ₂
Benzoic acid	,	Benzene	34 %	Benzaldehyde and CO ₂
<i>o</i> -Chlorobenzoic acid	,	Chlorobenzene	68 %	Benzene, CO ₂ and HCl
Anthraquinone	Dull red heat	Anthracene	82 %	Nil
Phenanthraquinone		Phenanthrene	76 %	Nil
Thiodiphenylamine	"	Carbazole	72 %	Hydrogen sulphide
α -Benzaldioxime		Desoxy benzoin	46 %	Benzylamine and NH ₃
Azobenzene	"	Aniline	85 %	Benzene and NH ₃
Isatin	"	Indole	80 %	Nil
Phthalic anhydride	,	Phthalide	86 %	Nil
Benzophenone	"	Diphenylmethane	86 %	Nil

FRIEDEL AND CRAFT'S REACTION WITH THORIUM POWDER

Benzoylbenzoic acid from benzoyl chloride and benzoic acid—Benzoyl chloride (4 g), benzoic acid (3 g) and

thorium powder (2 g) were heated under reflux at 200° until the evolution of hydrogen chloride ceased (15 hours). The product was treated with hydrochloric acid and steam distilled to remove any unchanged benzoic acid. The hot filtrate deposited needles of o-benzoylbenzoic acid on cooling. M P 127° . Yield 4 g.

Benzophenone from benzoyl chloride and benzene — Benzoyl chloride (7 g), benzene (25 g) and thorium powder (7 g) were heated under reflux on the water bath until the evolution of hydrogen chloride ceased (5 hours). The product was filtered to remove excess of thorium and treated with caustic soda to decompose any unchanged benzoyl chloride. Benzene was then removed by distillation on the water bath after which the residual benzophenone was distilled over a naked flame. B P 312° , Yield 2.5 g.

Acetophenone from acetyl chloride and benzene — This substance was obtained from acetyl chloride (13 g), benzene (13 g) and thorium (10 g) in a similar way to the above. B P $200-203^{\circ}$, Yield 9 g.

Anthraquinone from phthalyl chloride and benzene — Phthalyl chloride (15 g), benzene (30 c.c.) and thorium powder (3 g) were refluxed on the water bath for 12 hours. The reaction mixture was treated with excess of benzene, filtered and the benzene solution shaken with strong caustic soda solution in order to remove excess of phthalyl chloride. The benzene was removed by distillation and the residual anthraquinone crystallised from acetic acid. M P 276° , Yield 6 g.

Triphenylchloromethane from benzotrichloride and benzene — A mixture of benzene (20 g), benzotrichloride (20 g) and thorium powder (5 g) was heated under reflux on the water bath for 9 hours. Excess of benzene was added, the mixture filtered, washed with caustic soda and water, dried and the benzene removed by distillation on the water bath. The residue was distilled at 10 mm.

pressure on the naked flame when a pale yellow oil was obtained which solidified in the receiver M P 106, Yield 4.5 g

Preparation of benzotrichloride and dichlorodiphenyl methane from carbontetrachloride and benzene—A mixture of carbontetrachloride (30 g), benzene (100 g) and thorium powder (10 g) was heated under reflux on the water bath for 10 hours. The filtered product was freed from unchanged benzene and carbontetrachloride on the water bath and then distilled on the naked flame. Two fractions were obtained, that at 190–194° solidified in the ice chest and yielded benzophenone and hydrochloric acid on boiling with water and was therefore dichlorodiphenylmethane (benzophenonedichloride), while the fraction at 210–214° which gave benzoic acid on hydrolysis was undoubtedly benzotrichloride. Yield of dichlorodiphenyl methane was 4 g and that of benzotrichloride was 2.4 g

Diphenyl from chlorobenzene and benzene—This substance was prepared from chlorobenzene (5 g), benzene (10 g) and thorium (6 g) in a similar way to the above. Yield 5 g

Triphenylmethane from chloroform and benzene—A mixture of benzene (30 g), chloroform (10 g) and thorium powder (7 g) was refluxed on the water bath for 6 hours. The filtered product was freed from benzene and chloroform as usual and fractionated on the naked flame. The fraction at 298–304° solidified in the receiver to colourless crystals melting at 93°, and was identified to be triphenylmethane. Yield 2.2 g

Diphenyl from iodobenzene and benzene—This experiment was done in a similar way to the one described before, using chlorobenzene. The yield in this case was much better, namely 3 grams of diphenyl from 5 grams of iodobenzene.

Diphenylmethane from benzylchloride and benzene—Benzene (30 g), benzylchloride (15 g) and thorium powder (8 g) were refluxed on the water bath for 12 hours. The filtered product was freed from benzene and the residue fractionated over naked flame. The fraction at 259–261° which possessed an orange-like smell was identified to be diphenylmethane. B P 161°, Yield 8 g

ULLMANN'S REACTION WITH THORIUM POWDER

Diphenyl from chlorobenzene—Chlorobenzene (10 g) and thorium powder (5 g) were refluxed on the sand bath for 10 hours. The reaction product was extracted with hot 70 per cent alcohol and the extract cautiously diluted with water when the diphenyl crystallised out. M P 70°, yield 5 g

Diphenyl from bromobenzene—Prepared in a similar way to the above using the same proportion of bromobenzene. Yield 3.5 g

Diphenyl from iodobenzene—Prepared in a similar way from iodobenzene and thorium, using the same proportion of iodobenzene. Yield 4.5 g

Diphenyl ether from bromobenzene and phenol—A mixture of phenol (5 g), bromobenzene (9 g) and thorium powder (3 g) was refluxed on the sand bath for 8 hours. The reaction product was distilled in steam and the distillate extracted with ether. The ethereal extract was washed with caustic soda and water, the ether removed and the residue fractionated at the ordinary pressure. The fraction distilling at 250–252° had a fine flowery smell and was identified to be diphenyl ether. Yield 8 g

Diphenylamine from bromobenzene and aniline—A mixture of bromobenzene (10 g), aniline (9 g) and thorium powder (5 g) was refluxed on the sand bath for 6 hours. The product was poured into dilute hydrochloric acid, filtered and the residue crystallised from dilute alcohol

with the addition of animal charcoal in colourless crystals
M P 53° , Yield 4.5 g

Diethyl-succinate from ethyl-chloracetate—A mixture of ethyl-chloracetate (18 g) and thorium powder (4 g) was refluxed on the water bath for 7 hours. The filtered reaction product was then fractionated and the fraction boiling at $200\text{--}215^{\circ}$ (redistilled at $210\text{--}212^{\circ}$) was collected and identified to be diethyl-succinate. Yield 9 g

Succinic acid from chloroacetic acid—10 grams of sodium chloroacetate, 8 grams of sodium acetate and 8 grams of thorium powder were heated together at $160\text{--}180^{\circ}$ for 12 hours. The reaction product was treated with dilute hydrochloric acid, filtered and then treated with excess of ammonia. The precipitated thorium hydroxide was filtered off, the excess of ammonia removed by evaporation and the clear liquid precipitated with ferric chloride. The buff-coloured precipitate was suspended in water and decomposed with hydrogen sulphide. The precipitate of iron sulphide was filtered off and the filtrate evaporated to a small volume when succinic acid crystallised out. M P 180° , Yield, 5 g

Aminobenzophenone from benzoylchloride and aniline—A mixture of benzoylchloride (9 g), aniline (5 g) and thorium powder (3 g) was refluxed at 150° for five hours. The product was treated with excess of dilute caustic soda and steam distilled to remove unchanged aniline. The residue on extraction with alcohol and concentration of the alcohol extract deposited masses of yellow crystals which were identified to be p-aminobenzophenone. M P 106° , Yield, 2.2 g. The acetyl derivative of the substance melted at 73° and was identical with acetyl-p-aminobenzophenone.

Anthranilic acid from o-chlorobenzoic acid—5 grams of o-chlorobenzoic acid, excess of ammonia and 5 grams of thorium metal were refluxed on the water bath for 8 hours

The product was extracted with dilute hydrochloric acid filtered and the filtrate precipitated with a strong solution of sodium acetate. The precipitated anthranilic acid was filtered off and crystallised from hot water. M P 143° , Yield, 2.8 g.

O-Phenoxy-benzoic acid from phenol and o-chlorobenzoic acid—An intimate mixture of phenol (7 g), o-chlorobenzoic acid (5 g) and thorium powder (5 g) was heated under reflux for 7 hours. Any unchanged phenol was removed from the reaction product by steam distillation and the residue on extraction with alcohol and cautious dilution with water deposited crystals of o-phenoxy-benzoic acid. M P 115° , Yield, 3.2 g. On treatment with concentrated sulphuric acid it was converted into xanthone.

Unknown hydrocarbon from benzylchloride—A mixture of benzylchloride (10 g) and thorium powder (5 g) was refluxed at 180° for 5 hours. The product was extracted with benzene and the benzene extract evaporated when a colourless vitreous mass was obtained, melting sharp at 80° , which baffled all attempts at crystallisation. The substance was free from chlorine, did not form a picrate, had a composition of C 94.16 per cent, and H 5.86 per cent and a molecular weight of 136 by the cryoscopic method in benzene.

NEUTRAL REDUCTION WITH THORIUM POWDER

Picramic acid from picric acid—A mixture of picric acid (2 g), alcohol (20 cc), ammonium chloride (1.5 g) and thorium powder (3.5 g) was shaken in a shaking machine for one hour. The dark red solution was filtered from the unchanged metal and concentrated on the water bath, when brownish red crystals were obtained with a metallic reflex. These were identified to be picramic acid. M P 167° , Yield, 1.9 g. On shaking for 96 hours with

excess of thorium powder and ammonium chloride the above substance in alcoholic solution underwent complete reduction to triamidophenol

Benzohydrol from benzophenone—A mixture of benzophenone (2 g), alcohol (15 cc), ammonium chloride (5 g) and thorium powder (5 g) was shaken in a shaking machine for 7 hours. The filtered product was evaporated to dryness and the residue extracted with ligroin. On concentration of the ligroin extract, masses of colourless crystals were obtained which were further purified by recrystallisation from dilute alcohol. The substance was identified to be benzohydrol. M P 67° , Yield, 1.2 g

Sulphanilic acid and dimethy-p-phenylenediamine from methyl-orange—A mixture of methyl-orange (5 g), alcohol (50 cc), ammonium chloride (3 g) and powdered thorium (15 g) was shaken in a shaking machine for 12 hours. The filtered product after evaporation to dryness was extracted with ether and the ether evaporated in an atmosphere of carbon dioxide. The colourless crystalline residue was identified to be dimethy-p-phenylenediamine. M P 41° , Yield 1.1 g. The substance gets very quickly oxidised in the air.

The residue left after extraction with ether was then extracted with hot water and sulphanilic acid was obtained on cooling, Yield, 2.3 g

1 2 4—*triaminobenzene and aniline from chrysoidine*—A solution of chrysoidine (10 g) in water (50 cc) was shaken with thorium powder (15 g) for twenty-four hours with occasional warming on the water bath. The product was steam-distilled to recover the aniline, and the filtered residue on concentration in an atmosphere of carbon dioxide yielded colourless crystals, identified to be 1 2 4—triaminobenzene. Yield, 3.5 g aniline and 4.5 g 1 2 4—triaminobenzene

**PRESENCE OF FORMALDEHYDE IN THE
SOLAR AND TERRESTRIAL ATMOS-
PHERE AND THE PROBLEM OF
" CARBON ASSIMILATION "IN THE PLANTS**

BY

ATMA RAM

*Empress Victoria Reader, Chemistry Department,
Allahabad University*

Very few other problems in the vast field of Science have engaged the attention of workers to such a large extent as that of photosynthesis by the plants. Numerous investigators of great fame have been exploring the mysteries which the life of a plant presents to the human mind, probably from as early times as the history of chemistry itself, but even up to the present time we stand almost as ignorant as one and a half century ago, about the chemical processes going on in the plants. The great chemist Priestley began his celebrated researches on the chemical processes involved in photosynthesis as early as 1714, and since then various important researches have been carried on in this line.

In 1864, the great organic chemist Adolf van Baeyer gave out the view that the first stage in photosynthesis was the reduction of carbon dioxide and water vapour to formaldehyde under the action of sunlight. This photosynthesised formaldehyde was then polymerised to reducing sugars and to other carbohydrates known to occur in the plants. This hypothesis has been tested in numerous ways

and the most fruitful of all such attempts has been the synthesis of formaldehyde from carbon dioxide and water *in vitro*, on exposure to light. Usher and Priestley¹ Baly, Heilbron and Baiker² Dhal and co-workers³ Mezzadrol and collaborators⁴ and others have obtained formaldehyde from carbonic acid and bicarbonates in the presence or absence of catalysts, when exposed to light. On the other hand Spoehr,⁵ Baur and Rebmann,⁶ Porter and Ramsperger,⁷ Bell,⁸ Emerson,⁹ Zschiele,¹⁰ and Mackinney¹¹ obtained negative results although the latter worker made the following remark —

“The status of this problem is extraordinarily involved though it can hardly be doubted that some workers have succeeded in obtaining formaldehyde *in vitro*”

From this review of the literature it will be clear that there is a good deal of confusion regarding our views on photosynthesis. The reason why many of the workers have failed to obtain formaldehyde from carbon dioxide and water is the use of light of low intensity. It appears that the formation of formaldehyde is not only favoured by short wavelengths but a moderately high light intensity

¹ Usher and Priestley Proc Roy Soc, 1911 B 84, 101

² Baly, Heilbron, and Baiker J Chem Soc 1921 179, 1024

³ Dhal and Co-workers I Phys Chem, 1925 29, 926, 1931, 35, 1418, 1932, 36, 567

⁴ Mezzadrol and Collaborators Atti accad Lincei 1927 6, 100 Gazz. Chem, 1929, 59, 305

⁵ Spoehr J Ameri Chem Soc, 1923 45, 1184

⁶ Baur and Rebmann Helv Chim Acta, 1922, 5, 928

⁷ Porter and Ramsperger J Ameri Chem Soc, 1925 47, 79

⁸ Bell Trans Fara Soc, 1931, 27, 771

⁹ Emerson J Gen Physiol, 1929, 13, 163

¹⁰ Zschiele J Ameri Chem Soc, 1932, 54, 973

¹¹ Mackinney J Ameri Chem Soc, 1932, 54, 1688

is absolutely essential. In a recent communication,¹² we have been able to obtain larger yields of formaldehyde by the photoreduction of carbonic acid and the alkali bicarbonates by metals like magnesium, cerium, iron, etc.

Carbon dioxide and water vapour are well known to occur in the upper atmosphere, and it is very likely that under the action of ultraviolet light from the sun, they will combine and form formaldehyde and oxygen. Thus there is every likelihood of the presence of formaldehyde in the atmosphere. If formaldehyde is present in the atmosphere it should be partially washed down with rain water.

In order to test whether formaldehyde is present in the rain water, numerous samples of the freshly collected rain water obtained at Allahabad, Barlowganj (Mussoorie)—altitude 5500 feet—and at a village 420 miles from Allahabad during the year 1931-32 and 1932-33, have been analysed. These analyses are still in progress. In all cases, a definite and immediate evidence of the presence of formaldehyde in both distilled and undistilled rain water has been established, as tested by Schryver's reagent and by the reduction of ammoniacal silver nitrate solution. Recently it has been reported¹³ that formaldehyde is present in the freshly collected rain water. In the following pages an account will be given of the results obtained in the analysis of rain water, after a careful quantitative examination. The following points have been observed to be necessary about the presence of formaldehyde in the atmosphere.

1. That the amount of formaldehyde present in the rain water increases if the shower is preceded by a clear sunshine.

¹² Dhar and Ram. *Nature*, 1932, 129, 205, *Z. anorg. u. allgem. Chem.*, 1932, 206, 171.

¹³ Ram and Dhar. *Nature*, 1932, 130, 313.

- 2 When there is no sunshine between two showers the amount of formaldehyde is small as will be clear from the results recorded below
- 3 In order to get a clear evidence of formaldehyde the rain water should be freshly collected and analysed immediately after collection, as a part of the formaldehyde is lost by vaporisation and another part undergoes polymerisation (cf Norrish and Kirkbride, J Chem Soc, 1931, 1518)
- 4 After a very heavy shower the amount of formaldehyde is practically washed down and the rain water collected after such a heavy rainfall is mostly found free from formaldehyde
- 5 The amount of formaldehyde present in rain water is independent of the incidence of thunderstorms and electric lightning

EXPERIMENTAL

The rain water was collected in large porcelain dishes, placed on a tall stool in a clear space. After some experience, the above method of collecting rain water was improved as this procedure failed to give any idea of the amount of rainfall in inches. The device now adopted is to place a big glass funnel on a wooden frame and to put a big bottle below it which serves as a receiver for the rain water. The bottle is protected from outside so that no water beyond the funnel or dirt can find a way in the bottle. A rain gauge has been separately fixed which measures the amount of rainfall falling at a particular time. Definite volumes of rain water were distilled and the distillate was analysed for formaldehyde. An excess of standard N/10 solution of iodine was added to the distillate and subsequently 10

per cent sodium hydroxide solution till a permanent yellow colour was developed. The reaction was allowed to proceed for about fifteen minutes, and then the mixture was acidified with strong hydrochloric acid to liberate the excess of iodine. The excess of iodine so liberated was titrated against N/100 sodium thiosulphate solution.

1 cc N/10 iodine = 0.0015 gm of formaldehyde
The following are the experimental results

TABLE I

Date	Number of hours, after which the sample was analysed	Amount of formaldehyde in grams per liter of rain water	Remarks
15-7-32	12	0.00075	After a bright sunshine
20-7-32	7	0.00082	After a bright sunshine
21-7-32	4	0.0005	After a cloudy day
26-7-32	Immediately	0.001	After 5 days' bright sunshine and clear sky
27-7-32	do	(1) 0.00082 (2) 0.0006 (3) 0.00045	After a bright day. Collected three samples
28-7-32	do	0.00045	It had rained the previous evening
29-7-32	9	0.00052	After 9 hours' sunshine
30-7-32	5	0.0003	It had rained the very night
31-7-32	Immediately	0.0003	Very slow rainfall
1-8-32	do	(1) 0.00015 (2) very small	Heavy rainfall for 3 hours
2-8-32	4	0.00015	Occasional sunshine for 1 hour on the previous day
3-8-32	Immediately	0.00025	After 4 hours' sunshine
4-8-32	5	0.00015	Rained the very night
4-8-32	Immediately	0.00022	Sunshine for 2 hours
5-8-32	do	0.0005	Sunshine for the whole day
6-8-32	do	0.0003	Rainfall the very night

Date	Number of hours, after which the sample was analysed	Amount of formaldehyde in grams, per litre of rain water	Remarks
7 8-32	6	* absent	Heavy rainfall throughout the day and night
do	Immediately	* absent	
do	do	* absent	
8 8-32	9	do	Cloudy the whole day
9 8-32	Immediately	0 00045	5 hours' bright sunshine
do,	do	(1) 0 0003 (2) 0 00015 (3) very small	Cloudy—one of the heaviest rainfalls
10 8-32	do	0 00015	Cloudy the whole day and a very heavy rainfall the previous day
12 8-32	4	0 00015	Cloudy the whole day and the previous days
15 8-32	Immediately	0 0004	Bright sunshine on the previous day
16 8-32	do	0 0003	Rained the very night
17 8-32	do	0 0003	Occasional sunshine for two hours, a heavy rainfall

TABLE II

Presence of formaldehyde in rain water is independent of the incidence of thunderstorms and electric lightning

The following results support the above statement

Date	Amount of formaldehyde per litre of rain water	Remarks
13-1-33	0 00055 grm	Accompanied with thunderstorm
15-1-33	0 00055 ,	No thunderstorm
22-1-33	0 0004 ,	Accompanied with thunderstorm and hailstorm
25-1-33	0 0006 ,	No thunderstorm
12-3-33	0 00045 ,	No thunderstorm

Date	Amount of formaldehyde per litre of rain water	Remarks
13-3-33	0.0005 gm	Accompanied with thunderstorm
25-3-33	0.00075	Accompanied with thunderstorm
12-4-33	* 0.001 „	No thunderstorm
15-4-33	* 0.001 „	No thunderstorm
14-4-33	0.0007 „	Accompanied with severe thunderstorm and frequent lightning discharge
22-4-33	0.00007	Fairly heavy shower accompanied with thunderstorm, lightning discharge and also hailstorm

N B—It will be interesting to note here that the best results obtained in the analysis of rain water (marked with an asterisk) were on those days when the shower was not accompanied with either thunderstorm or electric lightning. The maximum amount of formaldehyde present in rain water analysed so far is 0.001 gm per litre of the freshly collected rain water.

DISCUSSION

As a result of the careful absorption measurements it is now generally believed that hardly any radiation from the sun shorter than 2900\AA reaches the surface of the earth. It is almost an accepted fact that a very thin layer of ozone (3 mm when reduced to 760 mm pressure) exists in the upper atmosphere at higher altitudes and is capable of absorbing solar radiations shorter than 2900\AA . This ozone is supposed to be formed by the absorption of shorter radiations by the oxygen atoms of the atmosphere. Very recently R. Mecke,¹⁴ has assumed that the photodecomposition of ozone by ultraviolet light with wavelengths shorter than 2635\AA is a primary reaction, whilst the formation of ozone requires excited oxygen molecules and the efficiency of the photo-ozonisation process can be raised by resonance

¹⁴ Mecke Fara Soc Discussion on Photoprocesses 1931, p. 375

effects Thus according to Mecke, the two primary photochemical reactions leading to an equilibrium are —



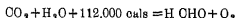
In each of these reactions excited oxygen atoms are formed Mecke has postulated the existence of several secondary reactions and has shown that at low pressure and small concentrations, which are undoubtedly met with at high altitudes of the atmosphere, the law of mass action is obeyed



$$[O_3]^2/[O_2]^3 = K \text{ (constant)}$$

From absorption measurements various physicists, notably Fabry and Buisson,¹⁵ Mecke,¹⁶ Dobson and coworkers,¹⁷ and several others have come to the conclusion that the mean altitude of the ozone layer in the atmosphere is about 50 kilometers and that at this height the atmospheric pressure is about 10^{-3} atmosphere From the experimental results recorded here it is clear that formaldehyde also exists in the upper layer of the atmosphere formed by the combination of carbon dioxide and water vapour, under the action of the ultraviolet light from the sun

It is now universally believed that the reaction



requires ultraviolet light of wavelength approximately 2550\AA It will be interesting to note here that Dhar and

¹⁵ Fabry and Buisson *Astrophys. J.*, 1921, 54

¹⁶ Mecke *Ibid*

¹⁷ Dobson and others *Proc Roy Soc*, 1930, A 129, 411.

collaborators have definitely shown that very seldom all the rays are absorbed by an absorbing solution. In the light of this observation it seems very likely that all the short ultraviolet rays coming from the sun will not be absorbed by the ozone layer present in the atmosphere. This statement is all the more strengthened in view of the small thickness of the ozone layer which is only 3 mm deep. Hence some of the shorter wave radiations are likely to pass through the ozone layer and decompose water into H and OH and these hydrogen atoms may reduce carbon dioxide to formaldehyde.

Absorption of solar radiations by formaldehyde —

In recent years Henri and Schou¹⁸ and Herzberg,¹⁹ have measured the absorption spectra of formaldehyde. They have found that the absorption spectra extend from 3700 Å to 2500 Å. The spectrum shows rotational fine structure down to 2750 Å but between 2750 Å and 2670 Å predissociation begins which continues up to 2500 Å. The predissociation limit is shifted by 70 Å towards the visible region when the temperature is elevated to 220°C. According to Fabry and Buisson,²⁰ the total thickness of the ozone layer when reduced to normal pressure is 3 mm, i.e., 0.4×10^{-6} , taking the height of the homogeneous atmosphere as a unit (7.99 kilometers). There are about 35 to 40 bands between 3700 Å and 2500 Å in the formaldehyde absorption spectra. The maximum is at 2935 Å characteristic of the aldehydes. It is apparent, therefore, that not only ozone absorbs the short wavelengths but the formaldehyde present in the atmosphere also absorbs the short rays of the solar radiations. Hence the absorption of the solar radiations shorter than 2900 Å

¹⁸ Henri and Schou. *Z. Physik*, 1928, 49, 744

¹⁹ Herzberg. *Trans. Faraday Soc.*, 1931, 27, 378

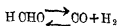
²⁰ Fabry and Buisson. *Ibid.*

which has been attributed so far to the presence of ozone, may be partially due to the presence of formaldehyde in the atmosphere

It has already been pointed out that formaldehyde has maximum absorption at 2935\AA , but the maximum absorption of ozone appears to be at 2655\AA . Hence it seems very likely that the ultraviolet rays filtered through the ozone layer may be absorbed by formaldehyde present in the atmosphere

It is well known that water vapour is present in the atmosphere to an appreciable extent even at a height of one hundred kilometers, but the amount of carbon dioxide present even at a height of forty kilometers is very small and is less than 0.01 per cent. It seems very probable that small amounts of formaldehyde may be formed nearly at the same height where ozone is formed under the action of ultraviolet light

Photodecomposition of formaldehyde—Formaldehyde is also photochemically decomposed in a manner analogous to that of the photodecomposition of ozone. As a result of their experiments on the photodecomposition of formaldehyde Norrish and Kirkbride²¹ have observed that the main products of the photochemical decomposition of formaldehyde are carbon dioxide and hydrogen. It is evident therefore that the following equilibrium



may be existing in the atmosphere. The upper atmosphere is well known to be rich in hydrogen and hence in the presence of hydrogen in the atmosphere the photodecomposition of formaldehyde will be markedly checked and appreciable amounts of formaldehyde can exist in the atmosphere at an altitude of 40 to 50 kilometers or lower than this. As water vapour exists in very small quantities

²¹ Norrish and Kirkbride J. Chem. Soc., 1932, 1518

even at a height of 100 kilometers the atmospheric formaldehyde may be partially washed down with the rain water and that is why all the samples of rain water collected and analysed so far contain more or less formaldehyde. At the end of a very heavy shower the amount of formaldehyde in the rain water becomes exceedingly small. This has been observed several times and these results have been marked with an asterisk in the table given above.

Formaldehyde present in rain water is not due to the photochemical decomposition of the vegetable matter present in the surroundings.—In order to test this point several litres of air present in the surroundings of the locality where the rain water was collected were passed through a series of tubes containing pure distilled water previously tested free from formaldehyde. On passing the air for a sufficiently long time through the water no trace of formaldehyde could be detected in it. This experiment was repeated several times in the day as well as in the night for periods extending from six to twelve hours and practically in all cases no formaldehyde could be tested in the water through which the air was passed. 50 litres of air were passed through 15 cc. of pure water free from formaldehyde in 15 hours. On testing this water no formaldehyde could be detected in it. In this connection, it will be interesting to note that the rain water collected on the same day when the above mentioned experiment was performed contained an appreciable amount of formaldehyde.

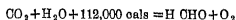
Formaldehyde is appreciably soluble in water and as such it should be absorbed by the water if it be present in the air. There are some arguments in support of the view that the formaldehyde detected in the rain water is not present as a result of the photodecomposition of the vegetable matter of the surroundings but is washed down

with the rain from the upper atmosphere The arguments are as follows

- 1 The failure to detect any formaldehyde in the water through which air has been passed, showing *that it is not present in the lower atmosphere but is obtained from the upper atmosphere*
- 2 *Absence of formaldehyde in the rain water collected after a very heavy shower* If formaldehyde present in the rain water would have been derived from the photo-decomposition of the vegetable matter there must have been some of it always present in the rain water, howsoever heavy shower it might have been
- 3 A greater amount of formaldehyde should have been present in rain water collected in the winter months than in the hot months, while it is just the reverse

Thus, from the arguments advanced here it is clear that formaldehyde detected in rain water is not obtained from the decomposition of the organic matter present in the surroundings, but is directly washed down by the rain from the upper atmosphere Another experimental proof in favour of this statement will be given at the end of the paper

Mechanism of the formation of formaldehyde in the atmosphere—It is well known that the reaction,



requires ultraviolet light of wavelength 2550 \AA It is very likely that some of the short wavelengths will pass through the ozone layer and cause the decomposition of water into H and OH and these freshly generated hydrogen atoms may reduce carbon dioxide to formaldehyde It appears

that the short wave radiations accelerate the reduction of carbon dioxide to formaldehyde by the atomic hydrogen. A molecule of water requires 110,000 cals to be dissociated into H and OH, that is to say, the energy required for the formation of a gram molecule of formaldehyde from carbon dioxide and water is practically the same as that required in the breaking of the H-OH link. The energy needed in both the reactions is practically the same and it is very probable that the real chemical change taking place in photosynthesis by the plants may be the photodissociation of the water molecules into H and OH. In a previous communication,²² it has been emphasised that chlorophyll apart from being an optical sensitiser also acts as a reducing agent. This statement is further strengthened by the presence of formaldehyde in the atmosphere and its formation from carbon dioxide and water in the manner explained above. It is very likely, therefore, that the function of chlorophyll and the carotinoids (which are good reducing agents) present in the leaves is that of a photosensitiser as well as that of a reducing agent helping the photoreduction of carbonic acid. These considerations seem to show that the real chemical change in carbon assimilation is the photolysis of the water molecules into H and OH by the absorption of the energy of the sun.

Origin of the free OH radical present in the atmosphere—From spectroscopic and various other considerations several authors have assumed the existence of free OH radical. Thus Haber and collaborators,²³ Hinshelwood,²⁴ and Frankenburger,²⁵ have put forward the view that in the combination of oxygen and hydrogen or the hydrocarbons OH radicals are

²² Dhar, Rao and Ram. *Fara Soc Dis*, 1931, p 554,

²³ Haber and collaborators. *Z Phys Chem*, 1928, 137, 263

²⁴ Hinshelwood. *Proc Roy Soc*, 1928, A 118, 170

²⁵ Frankenburger. *Fara Soc Dis*, 1931, p 431

formed. In an analogous manner the existence of OH radical has been postulated in the chain mechanism of the hydrogen-chlorine reaction where moisture acts as an impurity. Very recently, Franck and Haber,²⁶ Haber and Wansbrough-Jones,²⁷ Farkas and Wansbrough-Jones,²⁸ and several others have suggested that not only in photochemical reactions taking place in aqueous solutions but also in catalytic and enzyme reactions OH radicals play a very important rôle. These authors are of the opinion that in many photochemical reactions taking place in aqueous medium the real and the primary chemical change is the photolysis of water molecule into H and OH. The secondary reactions are believed to take place between the atomic hydrogen and the OH radicals and the other substances present in the reacting system.

It appears, therefore, that the mechanism of the formation of formaldehyde in the atmosphere is the same as that taking place in the plants. The first stage in carbon assimilation by the plants is the photochemical decomposition of water molecule into H and OH. It has already been pointed out that Henri and Schou, and Herzberg have observed 35 to 40 bands in the absorption spectra of formaldehyde, the maximum being at 2935 Å characteristic of the aldehydes. Thus, it is quite clear that not only ozone but also formaldehyde present in the atmosphere absorbs short rays from the solar radiations.

The following are some of the important lines* in the solar spectrum which have been attributed to presence of the free OH radical in the absorbing atmosphere of the

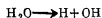
²⁶ Franck and Haber. Ber. Berlin. Akad., 1931, 250.

²⁷ Haber and Wansbrough-Jones. Z. Phys. Chem., 1932, 18B, 103.

²⁸ Farkas and Wansbrough-Jones. Ibid., 124.

* St. John, Moore, Ware, Adams, Babcock (Carnegie Institution of Washington, 1928).

sun The OH lines in the solar spectrum may be due to the presence of OH formed from the photochemical decomposition of water in the manner shown below



Wavelength	Intensity	Wavelength	Intensity
3267 063	1	3099 417	1
3255 498	1 N	3098 589	2
3229 884	0	3096 139	2
3210 47	0	3095 348	3
3206 239	0	3094 627	2
3203 981	1	3092 404	1
3200 963	1	3091 372	1
3188 060	1	3091 214	1 N
3181 991	3	3090 375	1
3177 681	1	3089 869	2
3147 448	1	3089 746	2
3146 935	1	3087 454	0
3146 599	1	3087 346	1
3139 165	2	3085 207	2
3136 891	1	3084 898	1
3134 338	1	3083 283	1
3130 568	1	3081 551	1
3126 618	1	3074 386	1
3124 919	2	3071 146	1
3123 960	1	3070 493	1
3122 571	2	3069 916	1
3121 770	1	3069 182	2
3114 779	1	3068 599	1
3106 033	2	3067 658	1
3105 678	1	3064 956	1
3102 149	1	3064 217	2
3101 243	1		

There are two other sources of hydrogen in the atmosphere, firstly, it can escape in the air from the

F 41

occluded gases inside the earth and in marshy places; secondly, it can reach the atmosphere from the probable photodecomposition of hydrocarbons like CH_4 , C_6H_6 and of H_2S , etc

It is well known that ammonia exists in the earth's atmosphere. Moreover, Fowler and Gregory²⁹ have concluded from their spectroscopic measurements that ammonia is present in the absorbing atmosphere of the sun. It is generally believed that cyanogen gas is also present in the absorbing atmosphere of the sun.

It will be interesting to note here that very recently Dhar,³⁰ has brought forward spectroscopic evidence in favour of the presence of formaldehyde in the solar atmosphere. He has shown that several unidentified lines in the solar spectrum agree fairly well with the absorption spectra of formaldehyde as observed by Henri and Schou. Hence it is very probable that like the free OH radical, formaldehyde may also form a part of the absorbing atmosphere of the sun.

The origin of these substances present in the atmosphere has not yet been satisfactorily explained. In view of the various arguments put forward here, it is not at all surprising that formaldehyde is present in the solar and the earth's atmosphere.

Formaldehyde present in the atmosphere and rain water, even in small quantities, serves as a ready-made food for plants (*cf* Bose Physiology of Photosynthesis, p 71). It can act as an antiseptic, can purify the air, and can act as a disinfectant to the soil.

The synthesis of formaldehyde from carbon dioxide and water has been denied by several authors and the chief criticism has been about the authenticity of the

²⁹ Fowler and Gregory Phil Trans, 1919, A 218, 351

³⁰ Dhar Z. anorg u. allgem Chem, 1932, 206, 270

experiments by which the presence of formaldehyde has been concluded. One of such arguments against formaldehyde being the first stage in carbon assimilation has been about the impurities present in the experiment. The presence of formaldehyde in the atmosphere and its formation from carbon dioxide and water vapour present in the atmosphere under the action of ultraviolet light from the sun leaves no room for doubt that formaldehyde is actually obtained from the photochemical reduction of carbon dioxide. Moreover, in the atmosphere there is no such danger of the organic impurities as can possibly be present in the experiments *in vitro*, and when it can be obtained from the atmosphere along with the rain it must have been generated there as a result of the action of ultraviolet light on carbon dioxide and water known to be present in the atmosphere. It has already been pointed that formaldehyde present in the atmosphere is not due to the photochemical decomposition of the organic matter present in the surroundings and hence it can only be present in the rain water as a result of its being washed from the upper atmosphere.

In the light of these observations there can hardly be any doubt *that formaldehyde is the first product obtained in carbon assimilation by the plants*

PRESENCE OF FORMALDEHYDE IN HAIL STONES

In several publications from these laboratories³¹ Dhar and the author have reported that formaldehyde is present in the freshly collected rain water and dew. It has been observed that the amount of formaldehyde in rain water varies from 0.00015 to 0.001 grm per litre. The amount of formaldehyde in dew is appreciably greater than that

³¹ Ram and Dhar. Nature, 1932, 130, 313, *ibid*, June, 1933

present in rain water In most of the samples of dew analysed at Allahabad and at a village 420 miles from Allahabad the amount of formaldehyde present per litre of dew was approximately 0 0015 grm

On 22nd April 1933, there was a heavy shower at Allahabad, accompanied by a severe hailstorm, thunder and lightning discharge Since the presence of formaldehyde had already been detected in the rain water and dew, it was thought profitable to test the water obtained from the hailstones, for formaldehyde In order to test this, fresh hailstones were collected in a clean beaker and carefully washed four times with pure distilled water free from formaldehyde The water so obtained was distilled and the distillate tested for formaldehyde There was a definite evidence of the presence of formaldehyde in the distillate as tested by the Schryver's reagent

The amount of formaldehyde present in the water from the hailstones was, however, less than that present in the rain water as shown below

Date	Amount of formaldehyde per litre of rain water	Amount of formaldehyde per litre of water obtained from hailstones
22 4-33	0 0007 grm	0 00055 grm

Thus it is clear that the amount of formaldehyde present in the water obtained from the hailstones is appreciably less than that present in the rain water The hailstones always fall after some rain has fallen, and thus the rain which has a precedence over the hailstones will wash some of the formaldehyde present in the atmosphere Hence the amount of formaldehyde present in the atmosphere to be absorbed by the hailstones is less than that which is absorbed by the rain It is due to this reason that the hailstones contain less formaldehyde than

that present in the rain water The observation cited above is only based on one experiment and it is hoped that this will be verified when there is a chance to test more samples of water from the hailstones In view of the undoubted presence of formaldehyde in rain water and dew it is not at all surprising that the water from the hailstones will also contain formaldehyde

The origin of the formaldehyde present in the hailstones appears to be the same as that in the rain water The presence of formaldehyde in the hail stones hardly leaves any room for doubt as to the origin of formaldehyde in the rain water The formaldehyde present in the hailstones cannot be due to the absorption of formaldehyde obtained from the photodecomposition of vegetable matter, but is certainly obtained from the upper atmosphere

This observation, therefore, if carefully verified will afford an argument in favour of the view of the origin of formaldehyde in the atmosphere as explained in the last few pages

In conclusion, the author expresses his gratitude to Prof N R Dhar, I E S, for the keen interest that he has taken, during the progress of this work

SUMMARY

1 It has been observed that freshly collected rain water contains formaldehyde to the extent of 0.00015 to 0.0012 gm per litre

2 The amount of formaldehyde increases if the rain is preceded by bright sunny days When the days are cloudy and there have been frequent showers, the amount of formaldehyde decreases and may altogether be absent immediately after a very heavy shower

3 The rain water should be immediately analysed when collected, because a part of the formaldehyde is lost by vaporisation and another by polymerisation

4 It is believed that the formaldehyde present in rain water is formed by the combination of carbon dioxide and water vapour present in the atmosphere by the absorption of ultraviolet light from the sun

5 The presence of formaldehyde in rain water cannot be attributed to the photodecomposition of substances of vegetable origin

6 The formaldehyde vapour shows light absorption between 3700\AA and 2500\AA , the maximum being at 2935\AA , characteristic of the aldehydes. It appears that not only ozone absorbs radiations of short wavelengths from the sun, but also the formaldehyde present in the atmosphere absorbs solar ultraviolet radiations

7 It is very likely that the water molecules are decomposed by absorption of short wave radiations and the hydrogen atoms set free reduce carbon dioxide to formaldehyde, which may be formed in the atmosphere at heights less than those where ozone is generated

8 It seems, that the energy required in the formation of formaldehyde from carbon dioxide and water vapour is the same as that required in the breaking of the H-OH link and the first stage in photosynthesis is the photodecomposition of water into H and OH

9 The formation of formaldehyde in the terrestrial atmosphere and in the plants appears to be due to the reduction of carbon dioxide by the atomic hydrogen formed from the photolysis of water

10 Several absorption lines in the solar spectrum are attributed to the existence of OH radical and formaldehyde in the absorbing atmosphere of the sun

11 The decomposition of formaldehyde is hindered by the presence of hydrogen in the atmosphere

12 Formaldehyde is also present in the water obtained from the hailstones. The amount of formaldehyde present in this water is less than that present in rain water

13 There is no relationship between the amount of formaldehyde present in rain water and the incidence of thunderstorm and electric lightning

**PHOTOCHEMICAL REDUCTION OF CARBONIC
ACID, CARBONATES AND BICARBONATES BY
METALS LIKE MAGNESIUM, IRON,
CERIUM, ETC , AND THE FORM-
ALDEHYDE THEORY OF
PHOTOSYNTHESIS**

BY

ATMA RAM

*Empress Victoria Reader, Chemistry Department
Allahabad University*

In previous publications¹ from these laboratories, it has been shown that formaldehyde is actually obtained by passing carbon dioxide into water in the presence of various organic and inorganic photocatalysts, when exposed to sunlight. Amongst the organic photocatalysts, chlorophyll, methylene blue, malachite green and methyl orange have been found to be the most effective in helping the photo-reduction of carbonic acid to formaldehyde. Amongst the inorganic ones, good results have been obtained with the following substances manganese chloride, cobalt and nickel carbonate, copper chloride and the carbonate.

Formaldehyde has also been obtained² from "nascent" carbon dioxide prepared by the interaction of carbonates of barium, sodium and calcium with hydrochloric acid.

¹ Dhar and Sanyal J Phys Chem, 1925, 29, 926, G. Gopala Rao and Dhar, Ibid, 1931, 35, 1418, Atma Ram and Dhar Ibid, 1932, 36, 567

² Atma Ram and Dhar J Phys Chem 1932, 36, 567.

when exposed to sunlight in the absence of a photocatalyst. It is interesting to note here that formaldehyde has also been detected when solutions of sodium and potassium bicarbonates are exposed to sunlight even in the absence of a photocatalyst and in the presence of substances like cobalt and nickel carbonates not only formaldehyde but also small amounts of the reducing sugars have been obtained as tested by the reduction of Benedict's solution.

After attaining success in the photosynthesis of formaldehyde from carbonic acid and the bicarbonates it was thought profitable to increase the yield of formaldehyde in these experiments as the velocity of photosynthesis as observed in the plants is very high. Since the chemical change involved in photosynthesis is of the nature of reduction of carbon dioxide and water to formaldehyde in presence of sunlight, it is very probable that the yield of formaldehyde may be appreciably increased if some artificial reducing agent be used instead of pure carbon dioxide or the bicarbonate solutions alone.

We have advanced³ the view that the chlorophyll not only absorbs the radiant energy necessary for photosynthesis, but also acts as a reducing agent for the reduction of carbonic acid (H_2CO_3) to formaldehyde ($HCHO$).

In order to reduce carbon dioxide and the bicarbonates experiments have been carried on with carbon dioxide and bicarbonate solutions by exposing their aqueous solutions to sunlight in the presence of such reducing substances as metallic magnesium, iron, zinc, aluminium, cerium, arsenic, tin, ferrous sulphate, manganese chloride, plant leaves freed from carbohydrates, etc. So far the best results have been obtained with metallic magnesium as the reducing agent with potassium bicarbonate solutions exposed to tropical sunlight.

³ Dhar, and collaborators Farad Soc Dis., on Photoprocesses, 1931, 554)

EXPERIMENTAL

The solutions were generally exposed in open beakers. Ordinarily Kahlbaum's samples of potassium bicarbonate and the metals were used and in every case blank experiments were performed. After the desired exposure the contents of the beakers were filtered and made up to the volume of the solution which was originally exposed. 10 cc of this filtrate were separately distilled for the qualitative test and the rest distilled for the estimation of formaldehyde. The quantitative analysis was carried out as follows:

To the distillate a known volume of a standard solution of iodine usually N/10 was added and then 10 per cent caustic soda solution, till a permanent yellow colour developed. The reaction was allowed to proceed to completion which took about 15 to 20 minutes, the mixture was then acidified with strong hydrochloric acid to liberate the excess of iodine. The excess of iodine so liberated was titrated against standard sodium thiosulphate solution usually N/100.

1 cc N/10 Iodine = 0.0015 gm of formaldehyde

The following are the experimental results

TABLE I

Experiment	Time of exposure	Amount of formaldehyde per 100cc of the solution
1 50 cc KHCO_3 , 2N, with two grms. of magnesium powder	4½ hours	0.0011 gm, no formic acid
2 50 cc KHCO_3 , 2N, with two grms of magnesium powder <i>kept in the dark</i>	nil	0.0008 gm, no formic acid
3 50 cc KHCO_3 , 2N, with two grms of metallic iron	5	0.00008 gm, no formic acid
4 50 cc KHCO_3 , N/1 with two grms of metallic cobalt	5	0.00007 gm, no formic acid

Experiment	Time of exposure	Amount of formaldehyde per 100cc of the solution
5 100 cc of KHCO_3 solution N/1 with two grms of metallic copper	5 hours	0.00005 gm, no formic acid
6 100 cc of KHCO_3 solution N/1 with two grms of cerium powder	do	0.0001 gm, no formic acid
7 100 cc of KHCO_3 solution N/1 with two grms of aluminum powder	do	0.00008 gm, no formic acid
8 100 cc N/1 KHCO_3 solution with two grms of arsenic metal	(1) do (2) 10 hours	Very small amount of formaldehyde 0.00007
9 100 cc N/1 KHCO_3 with two grms of tungsten metal	10 hours	0.00005
10 100 cc N/1 KHCO_3 solution with two grms of antimony powder	do	0.00007 gm
11 100 cc N/1 KHCO_3 with two grms of lead metal	do	0.00006 gm, no formic acid
12 100 cc N/1 KHCO_3 solution with two grms of zinc metal	do	0.00007, formic acid

Experiments with CO_2

13 100 cc of pure water saturated thrice with carbon dioxide with two grms of metallic magnesium	6 hours	0.0002 gm no formic acid,
14 100 cc of pure water saturated thrice with pure carbon dioxide containing two grms of zinc metal	do	0.00004
15 100 cc of pure water saturated with carbon dioxide with two grms of tungsten metal	do	0.00006
16 1000 cc of pure water with two grms of ferrous sulphate saturated with carbon dioxide	10 hours	0.00008
17 100 cc of water saturated with CO_2 with two grms of aluminum powder	6 hours	0.00008

Formaldehyde could also be obtained by exposing solutions of the carbonate of the alkali metals and ammonium carbonate in the presence of magnesium, iron, cerium, etc. The results obtained by exposing the solutions

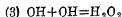
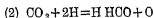
of the bicarbonates of sodium and potassium with ferrous sulphate and magnesium sulphate and several other inorganic substances have been very hopeful. In every case appreciable amounts of formaldehyde could be detected.

Some experiments were also performed with plant leaves which had previously been kept in the dark for about a week, so that the whole of their carbohydrate content was decomposed. Solutions of the bicarbonates of sodium and potassium and also the carbonates of these metals and ammonium carbonate were exposed to sunlight with the dried leaves. Similar beakers containing these solutions and the leaves to the same extent were also kept in the dark under identical conditions. As it is well known that chlorophyll of the leaves itself decomposes into formaldehyde and other products when exposed to sunlight or artificial light, blank experiments were performed in each case, in which no carbonate or the bicarbonate solution was used.

In all these experiments formaldehyde was detected. The amount of formaldehyde obtained from the beakers in which only the leaves were exposed was much less than from those in which solutions of the bicarbonates and carbonates were used. Hence it is quite clear that this excess of formaldehyde was obtained by the photochemical reduction of the bicarbonate and the carbonate solutions by the chlorophyll of the leaves. The amount of formaldehyde detected in the beakers kept in the dark was much less than that present in those exposed to sunlight.

Mechanism of the photo chemical reduction of carbon dioxide and the bicarbonates by the metals—It has been recently shown by the author that formaldehyde is very easily produced when substances of biochemical origin are exposed to air and sunlight. The reason of the large amount of formaldehyde being produced

in these experiments is the supply of energy obtained from the oxidation of the substance which partially activates the water molecule which in its turn dissociates into H and OH. These freshly formed hydrogen atoms being in the nascent or the active state are able to reduce the carbon dioxide molecule to formaldehyde much more readily than when carbon dioxide and water are exposed alone. We have advanced the view that the real and the primary chemical change in carbon assimilation is the photolysis of water into H and OH. The next stage is the reduction of carbon dioxide to formaldehyde by the hydrogen atoms generated from the photolysis of water, as represented below



The OH radicals produced in the photolysis of water combine with each other and form hydrogen peroxide which decomposes into water and oxygen.

The mechanism of the reduction of the bicarbonates and the carbonic acid by the metals to formaldehyde seems to be almost analogous to that explained above. Formaldehyde has also been obtained in the dark by treating carbonic acid or bicarbonate solutions by metals like magnesium, cerium, iron, etc. It has been shown by the author that small amounts of formaldehyde are obtained by treating bicarbonate solutions with yellow phosphorus, in the dark. In all these cases, the amount of formaldehyde formed in light is greater than that in the dark.

It appears, therefore, that the energy rich hydrogen produced by the action of the metals on water is capable of reducing the bicarbonate ion or carbonic acid to formaldehyde even in the dark aided by the energy obtained by

the reaction of the metals on the carbonic acid and the bicarbonate solutions. The mechanism of the production of formaldehyde in these experiments, therefore, seems to be the reduction of the carbonate or the bicarbonate ion by the hydrogen atoms produced by the action of the metals on water present in the system. On the basis of these experiments it is expected that the yield of formaldehyde obtained from the reduction of carbonic acid can be much increased if a suitable exothermal reaction be simultaneously going on in the system which supplies a part of the energy required for the activation of the water molecules and the carbon dioxide. Such an exothermal reaction is always accompanying photosynthesis in the plants and that is the oxidation of the food materials present, i.e., plant respiration.

The importance of these experiments lies in the fact that they afford an unequivocal evidence to the testimony of the view that formaldehyde is actually obtained *in vitro* from carbon dioxide and water when exposed to sunlight in the presence of photocatalysts. These experiments also lend a good deal of support to the view that chlorophyll apart from being an optical sensitiser also acts as a reducing agent. The yield of formaldehyde in the photoreduction of potassium bicarbonate solutions with magnesium powder has been so high that a distinct smell of formaldehyde could be obtained in the beakers.

These results are at a great variance with those of the previous workers who have tried to reduce carbon dioxide or the alkali bicarbonates by metals like magnesium. Fenton⁴ affected the reduction of carbonic acid using rods of amalgamated magnesium. On analysing the products he obtained formic acid as the main product of reduction and only traces of formaldehyde. It is very

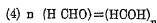
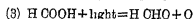
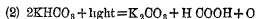
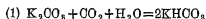
⁴ J. Chem. Soc., 1907, 91, 687

surprising to note in this connection that in all these experiments I have been altogether unsuccessful to detect the presence of formic acid, although such a large amount of formaldehyde has been obtained

It is interesting to note that Mezzadrol and co-workers⁵ have been able to obtain formaldehyde by exposing bicarbonate solutions alone to ultraviolet light

Stoklasa and collaborators⁶ from the results of their experiments concluded that neither formaldehyde nor carbohydrates are formed by the action of ultraviolet light on carbon dioxide and water in the absence of potassium hydroxide. They further state that formaldehyde is formed from carbon dioxide by the action of ultraviolet light only when there is present hydrogen in the nascent state and also potassium hydroxide be present

These authors are of the opinion that potassium hydroxide forms potassium bicarbonate with carbon dioxide and it is the bicarbonate which is reduced rather than carbon dioxide. As a result of these experiments Stoklasa and collaborators have advanced the view that formic acid is an intermediate product in the reduction of carbon dioxide to formaldehyde in presence of light. The following is the mechanism put forward by them to explain the photosynthetic process taking place in the plants



Thus Stoklasa considers that formic acid is an intermediate step in the reduction of carbonic acid to

⁵ *Atti R. Accad. Lincei* (IV), 1928, 8, 511

⁶ *Biochem. Zeit.*, 1911, 30, 432, *Ibid.*, 1913, 54, 330, 1912, 41, 333

formaldehyde It is important to note here that Stoklasa mentions no experiment to show that formaldehyde is actually obtained from the solutions of formic acid when exposed to radiations of short wavelengths He further adds that on illuminating the bicarbonate solutions to ultraviolet light hexose is obtained

The results cited here clearly point out that formaldehyde and not formic acid constitutes the first step in the reduction of carbonic acid The cause of this variation in the results of the various authors is not yet clearly known A serious attempt in this direction is also being made and it is very probable that the presence of some impurities in the metals used may cause this divergence in the results on the photoreduction of carbonic acid

My best thanks are due to Prof N R Dhar, I E S , for the valuable suggestions that he has made during the progress of this work

SUMMARY

(1) The photochemical reduction of carbonic acid, alkali bicarbonates and the carbonates of sodium, potassium and ammonium has been affected in presence of metals like magnesium, aluminium, zinc, iron, copper, cobalt, etc , and reducing agents like ferrous carbonate and manganese carbonate

(2) The main product of the reduction of carbon dioxide and bicarbonates in these experiments is formaldehyde and not formic acid as reported by Fenton

(3) The yield of formaldehyde is greater in light than in the dark, but Qureshi and Mohammad⁷ have reported to the contrary that the reaction is not all photochemical in nature

(4) No reducing sugar is obtained in the photoreduction of bicarbonates by the metals

⁷ J Phys Chem 1933, 37, 220

INDUCED AND PHOTOCHEMICAL OXIDATION OF SODIUM TARTRATE BY AIR

BY

DR C C PALIT

In foregoing publications,¹ we have shown that in presence of sunlight, several carbohydrates, glycerol, glycogen, nitrogenous substances and fats can be oxidised by simply passing air at the ordinary temperature. In recent papers² from this Laboratory, it has been proved that zinc oxide, ferric nitrate, uranium nitrate, etc., are powerful photochemical sensitizers and many photochemical reactions have been accelerated by the presence of each of these substances. We have investigated several of these photochemical oxidations in presence of zinc oxide, ferric nitrate and uranium nitrate as photo-catalysts. We carried on several experiments on the oxidation of sodium tartrate in presence of each of the above substances as photo-sensitizer and found that it could be completely oxidised in presence of uranium nitrate and ferric nitrate respectively by 36.5 litres of air in 5.5 hours.

We carried on further experiments³ and were able to oxidise sodium-tartrate, sodium formate, potassium-oxalate, citric acid, lactic acid, tartaric acid, lecithin, cholesterol, butter, milk, egg-white and egg-yellow in

¹ Palit and Dhar J. Phy. Chem., 29, 926 (1925), 32, 1263 (1928)

² Palit and Dhar J. Phy. Chem., 34, 993 (1930), Dhar J. Ind. Chem. Soc., 4, 495 (1927)

³ Palit J. Phy. Chem., 36, 2504 (1932)

presence of sunlight by air In another publication,⁴ we have conclusively proved that glycogen, lecithin, cholesterol, potassium oleate, potassium stearate, sodium-formate and food materials, such as, milk, butter, egg-white and egg-yellow, can also be oxidised by air in presence of inductors like ferrous or cerous hydroxide or sodium sulphite

In this paper, we are recording the experimental results obtained in the oxidation of sodium tartrate in presence of inductors like ferrous hydroxide or cerous hydroxide by passing air through its solution and also the results obtained in presence of alkali, alkali carbonate, alkali bicarbonate and alkali sulphite respectively in (1) diffused light, and (2) sunlight

In these experiments, a slow current of air free from carbon-dioxide is passed through a bottle containing the solution of sodium-tartrate In each case 10 c c of the solution under investigation are added to the inductor and the volume is then made up to 100 c c The experimental arrangement is the same as that described in previous papers After the experiment, the mixture is treated with a saturated solution of potassium sulphate to coagulate the precipitate of the hydroxide (ferrous or cerous), filtered and washed with water containing potassium sulphate till free from tartrate The filtrate is then concentrated to a smaller volume, say, 10-15 c c and heated with 5 grams of potassium chloride and 5 c c of glacial acetic acid (pure 99-100 per cent) The tartrate is then precipitated as bitartrate by the addition of 50-60 c c of absolute alcohol The precipitates are then allowed to settle for two hours and filtered and washed well with absolute alcohol till free from acid The precipitates are then dissolved in hot water and the solution is titrated with a standard solution of caustic soda, using phenolphthalein as indicator From

⁴ Palit and Dhar J Phy Chem, 34, 711 (1930)

the amount of alkali required, the quantity of tartrate is estimated. The following are the experimental results

TABLE No I

In each of this experiment, 20 c c of the solution of ferrous sulphate or cerous chloride were taken and precipitated as ferrous or cerous hydroxide by the addition of exact equivalent amount of alkali

20 c c of CeCl_3 Soln = 0.1069 grm of cerous hydroxide

20 c c of FeSO_4 Soln = 0.0648 grm of ferrous hydroxide

10 c c of Na-tartrate Soln = 5.1 c c. of N/10 Na OH

= 5.1×0.0194 grm

= 0.0989 grm of Sodium tartrate

Substance used as inductor	Volume of air passed in litres	Time during which air is passed in hours	Amount of sodium tartrate taken in 10 c c of the Soln in terms of N/10 caustic soda in c c	Amount of sodium tartrate left after the Expt in terms of N/10 caustic soda in c c	Amount of sodium tartrate oxidised in terms of N/10 caustic soda in c c	Percentage amount of sodium tartrate oxidised
Cerous hydroxide	86.5	18	5.1	2.95	2.15	42.15
Cerous hydroxide	73.0	30	"	2.10	3.00	58.80
Ferrous hydroxide	86.5	18	"	3.95	1.15	22.03
Ferrous hydroxide	78.0	30	"	3.20	1.80	37.80

From the results in the above Table No I, it is clearly seen that the amount of oxidation of sodium tartrate is greater with cerous hydroxide than with ferrous hydroxide used as inductors and that the amount of oxidation increases with (1) the increase of the time of reaction and (ii) the increase of volume of air which is passed through the solution.

It is well-known that copper in very small quantity accelerated these oxidations and other chemical reactions. Hence in order to find out whether copper, when added

in varying amounts to the inductors, would accelerate the oxidation of sodium tartrate, we have made a series of experiments. For this, to each of the solution of ferrous sulphate or cerous chloride, 5 c c of copper sulphate solution of varying concentrations are added and the whole precipitated as hydroxides by the addition of exact amount of equivalent alkali, caustic soda. These mixed hydroxides are then used as inductors. The following are the experimental results.

TABLE No II

In each of these experiments 20 c c of ferrous sulphate or cerous chloride solution were taken to which 5 c c of copper sulphate were added and then precipitated as hydroxides by the addition of equivalent amount of caustic soda.

20 c c of CeCl_3 Soln = 0.1089 grm of $\text{Ce}(\text{OH})_3$

20 c c of FeSO_4 Soln = 0.0648 grm of $\text{Fe}(\text{OH})_2$

10 c c of Na tartrate Soln = 0.0989 grm of Sodium tartrate

Substance used as inductor	Volume of air passed in litres	Time during which air is passed in hours	Amount of copper sulphate added in gram in 5 c c of the solution	Amount of sodium tartrate taken in 10 c c of the solution in terms of N/10 NaOH in c c	Amount of sodium tartrate left after the Expt in terms of N/10 NaOH in c c	Amount of sodium tartrate oxidised in terms of N/10 NaOH in c c	Percentage amount of sodium tartrate oxidised
Cerous hydroxide and copper hydroxide	36.5	13	0.05	5.1	3.5	1.6	31.37
Do do	36.5	18	0.025	5.1	2.7	2.4	47.06
Do do	73	30	0.0025	5.1	1.7	3.4	66.7
Ferrous hydroxide and copper hydroxide	36.5	13	0.05	5.1	4.2	0.9	17.6
Do do	36.5	18	0.0025	5.1	3.5	1.6	31.4
Do do	73	30	0.025	5.1	2.6	2.5	49.02

From Table No II, we find that the amount of oxidation of sodium tartrate is greatly accelerated by the addition of very small quantity of copper. On comparing the results given in Table No I and Table No II it is also seen that copper, when present in large quantity, acts as a marked retarder whilst it acts as an accelerator when present in very minute quantity. Hence the results of the investigation go to prove that the amount of oxidation of sodium tartrate is greatly accelerated with the decreasing amount of copper.

We have made several experiments to study the effect of the addition of alkali or alkali salts on the oxidation of sodium tartrate in aqueous solution—without any inductor such as ferrous or cerous hydroxide—in presence or absence of sunlight. The following results are obtained.

TABLE NO III —(DIFFUSED LIGHT—*i.e.*, IN ABSENCE OF SUNLIGHT)

In each of these experiments, 10 c.c. of sodium tartrate solution were taken to which a definite weight of alkali or alkali salt was added and air was then passed into the solution. The volume of air passed—20 litres in 7 hours

Substance used	Amount of substance added in grm	Amount of Sodium tartrate taken in 10 c.c. of the Soln in terms of N/10 NaOH in c.c.	Amount of Sodium tartrate left after the Expt in terms of N/10 NaOH in c.c.	Amount of Sodium tartrate oxidised in terms of N/10 NaOH in c.c.	Percentage amount of Sodium tartrate oxidised
Sodium hydroxide	0.04 (= 10 c.c. of N/10)	5.1	4.85	0.25	4.90
Sodium carbonate	0.10	"	4.90	0.20	3.92
Sodium bicarbonate	0.10	"	4.95	0.15	2.94
Sodium sulphite	0.10	"	4.80	0.80	5.90

TABLE NO IV —EXPERIMENT IN PRESENCE OF
SUNLIGHT

Substance used	Amount of substance added in grm	Amount of Sodium tartrate taken in 10 c.c of Soln in terms of N/10 NaOH in c.c	Amount of Sodium tartrate left after the Expt in terms of N/10 NaOH in c.c	Amount of Sodium tartrate oxidised in terms of N/10 NaOH in c.c	Percentage amount of Sodium tartrate oxidised
Sodium hydroxide	0.04 (= 10 c.c of N/10)	5.1	4.1	1.0	19.6
Sodium carbonate	0.10	5.1	4.2	0.9	17.6
Sodium bicarbonate	0.10	5.1	4.3	0.8	15.6
4 Sodium sulphite	0.10	5.1	3.3	1.8	25.5

The above results (Table III and Table IV) clearly show that the amount of oxidation of sodium tartrate is much greater in presence of sunlight than in its absence under the same conditions. The order of oxidation of sodium tartrate in presence of alkali or alkali salts in both the cases is the following

Sodium sulphite > Sodium hydroxide > Sodium carbonate >
Sodium bicarbonate

From these results, it appears that tartrates are readily oxidised both in presence of light or inductors. Hence it seems that in the animal body tartrates act not only as Buffers in maintaining the alkalinity of the system but they can also supply energy acting as food material.

Summary and Conclusion

1. Sodium tartrate has been oxidised in presence of inductors like ferrous hydroxide or cerous hydroxide and the amount of oxidation is greater with cerous hydroxide than with ferrous

hydroxide Also the greater is the time of reaction, the greater is the oxidation

2 It has been found that copper salts when present in very minute quantity greatly accelerate the oxidation of sodium tartrate but whilst present in larger quantity they act as marked retarders

3 Sodium tartrate can be oxidised both in presence or absence of sunlight by passing air through its solution when mixed with dilute alkali or alkali salts The amount of oxidation is greater in light than in its absence

4 The experimental results conclusively prove that the tartrates act not only as Buffers in maintaining the alkalinity of the system but can also supply energy acting as food material

SECTION II
ZOOLOGY

ON THE CYTOPLASMIC INCLUSIONS IN THE OOGENESIS OF SCIURUS PALMARUM

BY

MISS R. CLEMENT, M Sc ,
Zoology Department, University of Allahabad

CONTENTS

INTRODUCTION—

Material and Technique

- (a) Material
- (b) Technique

OBSERVATIONS—

- (a) General Structure of the Ovary
- (b) Golgi Apparatus
- (c) Mitochondria
- (d) Nucleus, Nucleolus and Nucleolar Extrusions
- (e) Yolk Bodies
- (f) Infiltration of Golgi Bodies from the follicular Epithelium to the Egg

INTRA VITAM AND VITAL STAINING EXPERIMENTS—

- Centrifuge
- Discussion
- Summary
- Lettering
- Explanation of Plates
- Bibliography

[N.B.—An abstract of the Thesis presented in lieu of two papers for the M Sc Degree, in 1932]

Introduction.

Little is known regarding the oogenesis of Mammals from the point of view of Cytoplasmic inclusions specially in the light of modern research

Previous work done on the subject by Cajal and his pupils and by Van der Stricht was carried out when cytological technique was not so well advanced. The only works of importance published during recent years are those of Gatenby on *Ornithorhynchus* (1922, 30), Nihoul (26, 53), P. R. Bhattacharya (31, 10)

Specific intra vitam staining methods were seriously introduced in 1924 when Parat advanced his vacuome theory. This theory has been considerably modified of late by Gatenby and Bowen and has thus lost its original importance.

Steady progress in cytological technique during recent years has led to better facilities for the study of cell inclusions and a combination of the old classical methods with the modern vital staining methods has given to cytological researches a solid foundation and a further impetus for valuable work. The present piece of work on the cytoplasmic inclusions in the oogenesis of the squirrel *sciurus palmarum* has been undertaken to elucidate the morphological nature and development of the cytoplasmic inclusions.

This problem was undertaken at the suggestion and under the supervision of Professor D. R. Bhattacharya and I take pleasure in expressing my deep sense of gratitude for the guidance and various suggestions offered to me during the course of the work.

Material and Technique

(A) *Material*—Squirrels are abundant here throughout all seasons of the year and breed twice a year

My work was mainly carried out from the end of November to the middle of March and during this period I could obtain ovaries containing eggs of all stages

The ovaries consist of a cylindrical compact mass attached to the body-wall by thin connective tissue. The animals were killed by either severing the head with a sharp scalpel or by giving a dip in water to make them slightly unconscious

The use of anesthetic was avoided. The ovaries were dissected out in physiological salt solution. The time elapsing between the killing of the animal and the subsequent fixing of the ovaries was cut down to the absolute minimum

The ovaries were cut into small pieces and placed in various fixatives

(B) *Technique*—For the demonstration of the Golgi bodies the following fixatives were used—Da'Fano's cobalt nitrate method, Ludford's latest modification of Mann-Kopsch technique. Da'Fano and Ludford methods gave very satisfactory results

For mitochondria Regaud, Regaud-Tupa and Zenker-Helly were tried among formaline fixatives. Among osmic fixatives Champy-Nassonov and chrome osmium technique gave very good results. They fix Golgi bodies as well as Mitochondria. Sections were bleached according to Henneguy's process by treating the sections with 1 per cent aqueous solution of potash permanganate for 5-10 seconds and then with 4 per cent solution of Oxalic Acid for 1-2 minutes. The slides were stained according to Champy-Kull's method in Altmann's Acid Fuchsin, tolu-

dine blue and aurantia and also in iron alum haematoxylin Schridde's method specially recommended for the demonstration of Mitochondria in Mammalian tissues was also tried. This method preserves fat as well.

For demonstrating nucleus and its derivatives Bouin's picric-formal method as given in Boles Lee's *Vade Mecum* gave good results. The sections were stained in Mann's methyl blue eosine and iron alum haematoxylin. Carnov's fluid was tried but gave poor fixation.

For demonstrating yolk, sections of osmic material were kept in turpentine for varying periods. By this method Golgi yolk which is fatty in nature dissolves out leaving clear vacuoles which have the osmiophilic Golgi ring. Fat methods such as Sudan III and Scharlach R were tried and gave the desired results. For the demonstration of albuminous yolk, if present, Bouin's fluid was also tried.

Observation.

(A) GENERAL STRUCTURE OF THE OVARY —The ovary consists of a number of oocytes in practically every stage of development and hence it is easy to follow the fate of the inclusions in a single section. The smaller oocytes are generally arranged towards the periphery of the ovary whereas the larger oocytes are found in the deeper parts of the ovary (Pl 2, Fig 17).

The egg membranes —The egg membranes consist of (1) follicular layer, (2) Zona Radiata or pellucida. In the youngest oocytes, the follicular layer consists of a single layer of cells (Pl 12, Fig 18). With the growth of the oocyte the follicular epithelium also increases and becomes double-layered (Pl 12, Fig 19) and later by further division forms several layers of cells. In the fully formed Graffian follicle the follicular epithelium consists of two distinct layers (Pl 2, Fig 20). As growth proceeds the

outer layer of cells grows more rapidly than the inner and spaces generally crescentic in shape appear between the two layers (Pl 1, Fig 8, cr sp) The Zona Radiata also increases in size It presents radial striations which form channels for the infiltration of Golgi bodies The clear homogenous layer described by P R Bhattacharya in the squirrel as taking the place of the follicular layer in tortoises appeared to be not very distinct in the material studied by me The cell membrane of the egg is in direct contact with the Zona

Corpus Luteum —The earlier stages in the formation of the corpus luteum were observed in some of the empty Graffian follicles from which the egg had been discharged The walls of the empty follicle seemed to be thrown into folds Later stages in the formation of the corpus luteum showed distinctly the luteal cells distinguished from the other cells of the follicle owing to the fact that they had very large nuclei

(B) GOLGI APPARATUS —True oögenial stages could not be found in the squirrel Ludford preparations gave a very successful picture of the Golgi apparatus In the very early oocytes the Golgi apparatus consists of a small juxta-nuclear mass in the form of a close network This represents the beginning of the Yolk-nucleus of Balbiani (Pl 1, Fig 1) The mass tends to increase in size (Pl 1, Fig 7) At a later stage, the Golgi network fragments It may even break up into two distinct masses, as seen in Ludford preparations (Pl 1, Fig 2) At a still later stage by further fragmentation of the concentrated Golgi apparatus discrete golgi elements are produced and are dispersed throughout the entire cytoplasm (Pl 1, Fig 4) Finally, the Golgi bodies arrange themselves at the periphery and form the peripheral ring so commonly found in many vertebrates (Pl 1, Fig 5) The number of Golgi

elements in the rest of the cytoplasm becomes considerably smaller and finally the medullary region is practically free from Golgi bodies which become confined to the periphery (Pl 1, Fig 6)

As regards the morphological nature of the Golgi apparatus it may be said that in the earlier stages the apparatus exhibits a close network which probably consists of definite vesicles and crescents massed together (Pl 1, Fig 2) In older stages the apparatus breaks up into individual elements

(C) MITOCHONDRIA —Champy and Nassonov preparations bleached and stained with Acid Fuchsin gave a splendid demonstration of the mitochondria which appeared in patches and were very deeply stained as compared to the general cytoplasm Champy preparations without post osmication and stained with Iron haematoxylin gave an equally convincing picture Regaud-Tupa preparations stained by Champy-Kull method were equally successful among the formalin preparations

In very young stages the mitochondria are arranged in a juxta-nuclear manner (Pl 1, Fig 10) as was the case with the Golgi bodies and represent the stage of the Yolk-nucleus of Balbiani Later the mitochondria form a cap at one pole of the nucleus being present in the form of a concentrated mass (Pl 1, Fig 11) The concentrated mass tends to move round and encircle the nucleus though still persisting as a compact area on one side of the egg As a result of the mitochondria surrounding the nucleus a perinuclear ring is formed (Pl 1, Figs 12 and 15) The mitochondrial ring now tends to move outwards from its perinuclear position and presents itself in the medullary region of the egg (Pl 1, Fig 12) After this, mitochondria are dispersed evenly in the cytoplasm (Pl 1, Figs 14 and 16)

(D) NUCLEOLAR EXTRUSIONS —The material fixed in Bouin's picro formol acetic acid fluid gave a very convincing picture

In the young stages the nucleus is very large occupying almost the whole cell. A distinct circular acidophilic nucleolus which stains dark pink in Mann's methyl eosine after Bouin fixation was visible standing out prominently owing to its deep colour. The nucleolus presented an interesting study for it showed a vacuolated appearance (Pl 2, Fig 23). Distinct nucleolar extrusions are visible in squirrel. In younger stages the nucleolus is large and prominent and divides into one or two smaller nucleoli (Pl 2, Fig 21). In some oocytes the nucleolus is actually seen giving rise to buds. Very soon owing to the activity of the nucleolus a large number of nucleoli are formed (Pl 2 Fig 24). These nucleoli formed by the budding of the original nucleolus become arranged and closely adhere to the nucleolar membrane (Pl 2, Fig 24). From this stage they seem to migrate into the cytoplasm as distinct bodies staining like the nucleoli (Pl 2, Fig 22). The nucleolar extrusions take no part in vitellogenesis.

(E) YOLK BODIES —Yolk bodies in the case of Squirrel are of fatty nature. There was no definite indication of proteid yolk either in the fixed preparation or in living cells. Ludford's modification of Mann-Kopsch technique seems to be an ideal fixation for the study of yolk and Schridders' method for mammalian tissues also gave satisfactory results. The yolk bodies appeared as large spherical structures of all sizes and became deep black in all osmic fixatives. The slides were given a prolonged treatment in turpentine and xylol. This dissolves out fatty yolk leaving behind vacuoles having a distinct chromophilic rim all round the empty vacuoles or in the form of a crescent enveloping the vacuole (Pl 1, Fig 9).

In the formation of a yolk body the Golgi element swells up and gives rise to yolk. Successive stages in the formation of Golgi yolk can be observed, intermediate stages between the original Golgi bodies and the yolk bodies are present. There was no definite indication of proteid yolk though rarely distinct vacuoles having in certain cases some sort of coagulum were found (Pl 1, Fig 9). No earlier stages in the formation of these water vacuoles could be traced. They may be ordinary water vacuoles as described by Gatenby in *Ornithorhynchus paradoxus*.

(F) INFILTRATION OF GOLGI BODIES FROM THE FOLLICULAR EPITHELIUM TO THE EGG—This phenomenon was described for the first time by Brambell and Bhattacharya in the fowl and tortoise respectively (25, 17), (25, 5). Bhattacharya, Das and Dutta observed it in birds (29, 8) and reptiles. P. R. Bhattacharya (31, 10) has given proof of its presence in mammals such as rat, rabbit and squirrel. In the case of squirrel it has been observed that the follicular epithelium produces a large number of Golgi bodies and these pass down through distinct radial striations in the Zona Radiata (Pl 1, Fig 8). From the Zona they pass directly to the egg and collect at the cortical region of the egg. The Golgi bodies that undergo this process of infiltration in the squirrel pass in the form of fine granules.

Intra Vitam and Vital Staining Experiments.

The ovary of squirrel affords poor material for the study of living cells for the following reasons

- (1) The ovary is a compact mass with plenty of connective tissue which prevents the penetration of vital dyes

- (2) The follicle cells are many-layered especially in the older oocytes and afford resistance to the rapid penetration of the stain
- (3) There is plenty of fat in the ovary which prevents and obscures the study of the inclusion

The method of observation consisted in placing a small portion of the ovary on a clean slide with a drop of physiological salt solution. It was teased out so as to remove the individual oocytes. The Golgi bodies were visible as highly refractile bodies which stood out prominently from the rest of the cytoplasm. They appeared in the form of vesicle and crescents with an osmiophilic or argen-tophilic rim and a central chromophobic substance (Pl 2, Fig 25)

The yolk bodies were also visible being highly refractile. Their Golgi origin was distinctly visible owing to the presence of the greyish osmiophilic rim around the yolk bodies. After a drop of osmic was run under the cover slip, in about ten minutes, the Golgi bodies and the yolk bodies became greyish black.

The dyes used were neutral red and Janus green B. The above stains were prepared by dissolving 1 gm of neutral red or Janus green B in 50 c c of salt solution (6 gms in 1000 c c of distilled water). The stains were placed in the bath at 38° for a full day before use. The stains were further diluted according to requirements. A portion of the ovary was placed in neutral red. In about 30-40 minutes the vacuome made its appearance. The Golgi bodies stand out prominently and the vacuome was seen in patches coloured faintly pink (Pl 2, Fig 26V).

In very young oocytes the Golgi bodies appeared concentrated in a juxta nuclear position forming the yolk nucleus of Balbiani as in the fixed preparation. In older oocytes the Golgi bodies were lying dispersed throughout the cytoplasm and the vacuome was seen in patches. Yolk bodies were also seen. When a drop of osmic was run under the cover slip the Golgi bodies and the yolk became greyish. The vacuome was unaffected (Pl 2, Fig 27). For the study of the mitochondria ovaries were placed in a dilute solution of Janus green B. The mitochondria were stained light green. For demonstrating yolk bodies Scharlach R and Sudan III were tried. The yolk bodies were stained dark pink with Sudan III (Pl 2 Fig 28), and orange with Scharlach R (Pl 2, Fig 29).

(G) CENTRIFUGE.—Pieces of the ovary were centrifuged at a speed of 3 500 revolutions per minute. Experience showed that four hours of centrifuge gave best results. 2½ hours showed practically nothing whereas three hours showed that the time was not quite sufficient as the definite cell layers were not well separated. The centrifuge material was fixed in Champy-Nassonov. Da'Fano, Ludford. On examining the slides it was found that there were two distinct zones (Pl 2, Fig 30). Champy-Nassonov gave very satisfactory results. In unstained preparations the lower zone appeared greyish with dusty refringent mitochondria. This zone occupied half the oocyte. The other half was deep black full of yolk bodies of all sizes and also discrete Golgi bodies. Sections were also stained by Champy-Kull method. The mitochondria were beautifully stained (Pl 2, Fig 30).

The disposition of the cytoplasmic inclusions in centrifuge material offers conclusive evidence as regards the relationship existing between the various cell components. The Golgi elements contribute to yolk formation and mito-

chondria do not seem to take any part in vitellogenesis
There appears to be no proteid yolk

Discussion

GOLGI BODIES —Camillo Golgi (1898) first described the apparatus reticular interno in the cytoplasm of the Purkinjee cells of the cerebellar cortex of the owl's brain. He was of the opinion that the internal reticular apparatus consisted of a close network of fibrille located in a fairly definite region between the nucleus and cell surface. He held that the network was entirely intra-cellular having no definite communication with extra cellular structures. Later Holmgren found a system of structures which was identical with the apparatus discovered by Golgi. According to Holmgren the Golgi apparatus is a system of intra-cellular canals arising from ingrowths of cytoplasmic processes (trophospongium). Parat and Painleve (24b 55) maintain that the apparatus of Golgi and the trophospongium are artefacts and the reality is a system of vacuoles and granules (vacuome).

This theory has been refuted by Gatenby, Bowen, Bhattacharya, Nath, etc.

The young stages of squirrel oocytes examined by me in preparations fixed by Da'Fano and Ludford methods showed the Golgi apparatus in the form of a network. This reticular nature may be due to the running together of Golgi elements under the influence of fixatives. This sort of network is found in somatic cells of mammals and in a vast majority it is reported to consist of anastomosing strands of Golgi material.

The study of the Golgi bodies in the squirrel by intra vitam and vital staining experiments showed that they are distinct from vacuome. The latter is stained with neutral red whereas the former is unaffected. Hence this argument is urged against Parat's contention which holds that

the Golgi bodies are homologous with the vacuome It is now generally believed that the Golgi elements are in the form of crescents and vesicles with a distinctly argentophilic or osmiophilic rim and a central chromophobic substance

The duplex structure of the Golgi elements has been shown by Gatenby in Moth spermatocyte (20, 24) Nath and his collaborators have shown the duplex structure of the Golgi elements in various animals, e.g., Spider (28, 45), *Luciola* (29, 50), *Ophiocephalus* and *Rita* (31, 52)

In the case of squirrel also I find the Golgi apparatus both in fixed preparations and intra vitam and vital staining experiments show a distinct duplex structure consisting of an osmiophilic rim and a central chromophobic substance According to Parat the argentophilic structure is formed by modified mitochondria This could not be possible for on this assumption the argentophilic rim should be stained with Janus green B, which is not the case

MITOCHONDRIA—Interest in mitochondria dates back to 1898 when Altmann published his account on "The elementary organs and their relationship to the cell" It was in 1902 that Benda gave the name mitochondria They are reported to assume various shapes—globular, rod-like, filamentar, irregular, etc In the case of squirrel they appear in distinct patches of very small granules They were seen in the earliest stages in a concentrated form in the yolk nucleus of Balbiani area which appears to be the focus of growth and dispersal They form a perinuclear ring which spreads out and establishes itself in the medullary region From this stage they are dispersed in the cytoplasm At this stage of dispersal in animals in general many workers have found mitochondria playing an active part in vitellogenesis Mitochondria have been known to take part directly or indirectly in vitellogenesis This, for example, Van der Stricht (1905) work-

ing on mammals has shown the origin of the yolk from mitochondria Russo (10, 59) has shown the indirect role of mitochondria in vitellogenesis where they arrange themselves around vacuoles This has been observed by a number of workers, e g , Bhattacharya and K Behari Lal have described it in Tortoises (29, 9) In the case of squirrel mitochondria do not play any part in vitellogenesis either directly or indirectly Isolated mitochondria could be seen only rarely

NUCLEUS AND NUCLEOLAR EXTRUSIONS —The nucleus in the case of squirrel is vacuolated Hogben has described the vacuolated condition in *Periplaneta orientalis* (20, 34) and Nath and Piare Mohan have also shown it in the case of *Periplaneta americana* (29, 51) In these the nucleolar extrusions were also vacuolated but no indication of the nucleolar extrusions being vacuolated was observed in the case of squirrel A number of workers have shown that the nucleus plays an important part in the nutrition of the egg Gatenby (22, 25) working on *Saccocirrus* was one of the earliest to show the exact relationship between nucleus and the process of vitellogenesis He has shown that albuminous yolk in this animal originates directly from nucleolar extrusion

Nath has described this in *Euscorpius napolii* and *Buthus judaicus* (25, 44) and in *Periplaneta americana* (27, 51)

In the case of squirrel it has been observed that the nucleolar extrusions play no part in vitellogenesis

YOLK BODIES —Till recently yolk bodies were supposed to include all sorts of granules formed in the cytoplasm Now it is distinguished as a non-living deutoplasmic reserve material, built up by the activity of the cytoplasm and cell organs Generally speaking two distinct types of yolk—the albuminous and fatty yolk—are found The former appears greyish while the latter goes deep black

in osmic preparations The exact method of the origin of yolk furnishes the most controversial subject among cytologists at the present day Brambell (24, 16) points out four distinct sources of yolk elaboration

- (1) Golgi Apparatus
- (2) Mitochondria
- (3) Nucleolar Extrusions
- (4) Ground Cytoplasm

The study of yolk in mammals is interesting Firstly, yolk in mammals more especially Eutherian mammals is present in small quantities for the young receives nourishment from its mother by means of the placenta, nevertheless yolk is present to a degree which varies greatly in different species Thus, for example, the Guinea pig's ovum has more yolk than that of the rabbit and is present in the form of spherules The ova of the domestic pig is heavily laden with yolk

As regards the origin of the yolk in mammals various theories have been advanced Hertwig claims that deutoplasmic granules are laid down by chromotod material extruded from the nucleus

Others such as Russo (10, 59) claim that mitochondria are arranged around vacuoles in the cytoplasm to the transformation of mitochondria into yolk

Thirdly, the Ghent School summing up the work of Van der Stricht (23, 62), states that yolk is found in vacuoles during the dispersal of mitochondria

In my observations in the case of Squirrel no definite indication of albuminous yolk is forthcoming Fatty yolk bodies of all sizes are visible both in fresh and fixed preparation and arise directly by the swelling up of the Golgi elements The fact that Golgi elements swelling up during yolk formation proves that the Golgi elements have a certain amount of independence and hence could assimilate, grow and divide

VACUOME—Controversy at the present day has been raging in regard to what is called the vacuome theory Maurice Parat, originator of the animal vacuome hypothesis, in collaboration with J Painleve introduced the idea of the Golgi apparatus being in the form of a vacuome in the salivary glands of the chironomus larva (24a, 54). He maintains that there are two visible cytoplasmic inclusions, namely, the chondriome and the vacuome Subsequently the same workers (24b, 55) reported that the technique of Da'Fano and Prenant-Kopsch gave images absolutely super-imposable with those of neutral red They also showed that prolonged immersion in neutral red brought about the formation of discrete vacuoles of a canalicular system which they consider homologous to the canalicular system or apparatus of Golgi In a later paper (24c, 56) they stated that the internal reticular apparatus is produced by the precipitations of metallic silver or osmium in the interior on the periphery or in the intervals between protoplasmic vacuoles

The above hypothesis gained ground between the year 1924—1928 Gatenby in 1929, exploded this theory and showed that the vacuomes and Golgi apparatus were distinct and separate structure Krujukowa in 1929 on his studies of the chironomus larva found typical Golgi bodies distinct and separate from vacuome (29, 37) Also H W Beams and his associate Goldsmith (29) (3) having gone over the same material find Golgi bodies distinct from vacuome Nath, 1931 (48), in the egg of *Rana Tigrina* and *Ophiocephalus punctatus* and Rita rita, Nath and Nangia, 1931 (52), have shown that vacuoles are different from Golgi elements which go black in Da'Fano, Kolatchev and cannot be stained with neutral red Bhattacharya and Das (in 1928) have shown in the pigeon's ovary that the vacuome and Golgi elements are distinct and independent structures. Likewise P R Bhattacharya and S K

Dutta (31) (11), on vital staining experiments in *Clarias batrachus* have shown that the Golgi bodies and vacuome are not homologous but the two are clearly distinct from each other Bowen (27) (15) working on plant cells came to the conclusion that osmiophilic platelets and Golgi bodies were homologous and that the Golgi bodies and vacuome were distinct and separate structures Poisson (27), Voinov (27) (64), Hirschler (35), and many others have carried out investigations which have made them admit to the almost universal occurrence of some form of vacuome Gatenby in *Pseudotriton* has shown prozymogen granules (31, 28) distinct from Golgi apparatus

My observations in the case of squirrel are in disagreement with Parat's views and like other workers I find the Golgi bodies in this animal are distinct from the vacuome The former is not stained with neutral red, although the latter takes in the stain

The close approximation of Golgi bodies and vacuome and the topographical relationship in the yolk nucleus is probably due to the fact that the force which brings all other cell organs within the yolk nucleus area is also responsible for keeping vacuome in close relationship with Golgi elements

YOLK NUCLEUS—The problem of the yolk nucleus is one of the oldest of cytological problems Its structure in spite of the brilliant researches of Balbiani, Bambeke and Van der Stricht remains yet a mystery The yolk nucleus was described for the first time in the oocyte of the spider (*Tegenaria domestica*) by Wittich in 1845 In 1850 Carus gave to this formation the name of "Dotterkern" and in 1867 Milne Edwards gave the name of vesicle de Balbiani in appreciation of the work done by the latter on yolk nucleus The yolk nucleus of different authors is not analogous structures

Weiner classifies the yolk nucleus under five categories from the point of view of works published on the subject (1) The yolk nucleus is of a nuclear nature (Henneguy, Julian, etc) or of a chromatic nature (Calkins) (2) The yolk nucleus is of a mitochondrial nature (Hirschler, 1916) Faure-Fremiet, 1910 (3) The yolk nucleus corresponds to the Golgi apparatus (Sjovall, 1906, Weigl, 1912) (4) The yolk nucleus is the centrosome Balbianin, 1893 Mertens, 1895 Hollander, 1904 Vander Stricht, 1905 This view is accepted by a large number of authors although sufficient proof is lacking (5) The yolk nucleus is a nutritive mass of material Schultz 1882 Stuhlmann, 1886 Monticelli, 1892 Weiner in Tegenaria (1925) describes the yolk nucleus as arising in the form of a homogeneous spherical mass containing particles of Golgi apparatus in the oögonium In the oocytes two regions may be distinguished (1) A central mass corresponding more or less to the yolk nucleus in the oögonium (2) A concentric zone formed of a capsule enveloping the central mass Weiner concludes that yolk nucleus is a mass of specific substance, elaborated by the Golgi apparatus This may contain mitochondria isolated Golgi apparatus and also the centrosome which play only a secondary part in the formation of the yolk nucleus I have quoted Weiner at length because the formation and the structure of yolk nucleus remains still one of the unsolved problems of cytology From an examination of my material it is apparent that the yolk nucleus area lodges in the first instance all the important cell components, e g , Golgi bodies, mitochondria and vacuome, before it finally breaks up Therefore it may be said to be a mass of archollasmic matter which serves as a focus of growth disruption and dispersal for all cell organs Whether it is initially elaborated by the Golgi apparatus or mitochondria or the centrosome or all of them combined

together is a matter which only further investigation can elucidate

Summary

1 The oogenesis of Squirrel has been worked out by fixed preparations as well as by *intia vitam* and vital staining experiments

2 The ovary consists of a number of oocytes, the smaller ones being arranged about the periphery and the larger ones more deeply situated. No oogonial stages are visible in the material available

3 Egg membranes consist of a follicular epithelium and Zona Radiata

4 The development of follicle shows it to be at first single layered, then double layered. Later on it becomes many-layered consisting of an outer layer of follicle cells and an inner layer as growth proceeds crescentic spaces arise

5 Corpus luteum is present. During growth follicle cells undergo infolding. Luteal cells appear with large nuclei

6 Golgi bodies appear in a juxta-nuclear manner in young oocytes both in fixed preparations and vital staining experiments

7 In fixed preparations Golgi bodies in earlier stages appear to form a network. This juxta-nuclear mass later breaks up and is dispersed in the cytoplasm

8 Golgi bodies are present in the form of vesicles and crescents having a duplex structure, an osmophilic rim and a central chromophobic portion

9 A peripheral ring of Golgi bodies is formed leaving the rest of the oocyte practically free from Golgi elements

10 Infiltration of Golgi bodies takes place from the follicular epithelium to the egg

11 Mitochondria are concentrated in earlier stages in the yolk nucleus of Balbiani area. They form a perinuclear ring and later a ring in the medullary zone. They are evenly dispersed in the cytoplasm and take no part in vitellogenesis. They appear in the form of patches

12 A distinct vacuolated nucleus is present. Nucleolar extrusions occur but take no part in vitellogenesis

13 Yolk bodies are found both in the fixed preparations as well as in *intia vitam* and vital staining experiments. They are

easily stained with Sudan III and Scharlach R. They have a Golgi origin and are followed by the swelling up of Golgi bodies, and by storing fat in their interior.

14. There is no indication of proteid yolk. This is confirmed by centrifuge experiments and Bouin preparations. A number of vacuoles are present in some cases having in their interior some sort of coagulum. They may be water vacuoles.

15. Vacuome is present and is stainable with neutral red. It is distinct from Golgi bodies, which remain unaffected in this dye. The vacuome is at first concentrated in the yolk nucleus of Balbiani and finally dispersed like the Golgi bodies and mitochondria throughout the cytoplasm.

Lettering

Chr	Chromatin
Cr Sp	Crescentic spaces
FF	Follicular epithelium
FE N	Follicular epithelium nucleus
GB	Golgi bodies
G Cr	Golgi crescents
G V	Golgi vacuole
G Y	Golgi Yolk
Gr Foll	Graffian follicle
IN F	Infiltration of Golgi bodies
IL Foll	Inner layer of follicle cells
M	Mitochondria
MP	Mitochondrial patches
Med R M	Medullary ring of mitochondria
N	Nucleus
Nu	Nucleolus
NE	Nucleolar extrusions
M C N	Mitochondrial cap of nucleus
Ooc	Oocyte
Peri R M	Perinuclear ring of mitochondria
Perip R.G	Peripheral ring of Golgi bodies
V G B	Vesicular Golgi bodies
V	Patch of vacuome
V Nu	Vacuolated nucleolus
W V	Watery vacuoles
Y N B	Yolk nucleus of Balbiani
Z R	Zona Radiata

Explanation of Plates

The drawings were made under Leitz Abbe Camera Lucida.

PLATE 1

Figs. 1—6. Ludford unstained.

Fig. 1. A very young oocyte in which the Golgi elements are clustered together in the yolk nucleus of Balbiani. X 375.

Fig. 2. A later stage. The Golgi network has broken up into two masses, vesicles and crescents are present.

Fig. 3. A still further advanced stage where the Golgi network has broken up into a number of distinct masses X 375.

Fig. 4. An oocyte where the Golgi bodies are dispersed throughout the cytoplasm X 375.

Fig. 5. Oocyte showing the peripheral ring of Golgi bodies X 375.

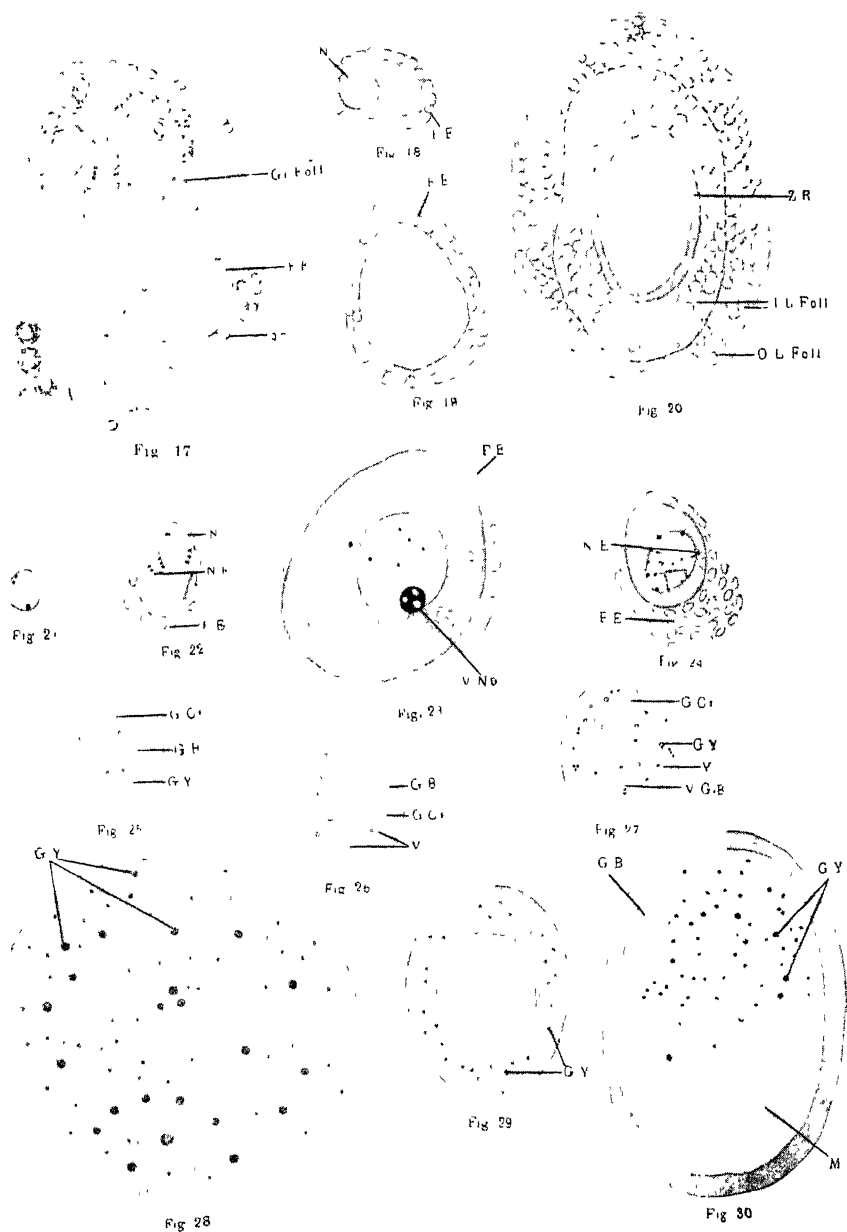
Fig. 6. An oocyte where the peripheral ring is established, the rest of the cytoplasm is free from Golgi bodies X 375.

Fig. 7. Da'Fano preparation stained with safranin and light green. The Golgi bodies are in the area of the yolk nucleus of Balbiani. The concentrated Golgi bodies are in the form of a network X 375.

Fig. 8. Ludford preparation unstained. A portion of the follicular epithelium and oocyte highly magnified showing the infiltration of the Golgi bodies from the follicular epithelium to the egg. The Zona Radiata presents radial striations and the Golgi bodies are seen passing in the form of granules from the follicle cell to the cortical region of the egg X 845.

Fig. 9. Ludford preparation unstained after treatment in turpentine. A stage in the formation of yolk. Fatty Yolk is present all over the cytoplasm. Empty yolk vacuoles present with an osmiophilic rim. Watery vacuoles are also present in the cytoplasm X 1230.

PLATE II



Figs. 10—14. Champy-Nassonov bleached and stained by Champy-Kull method.

Fig. 10. A young oocyte in which the mitochondria are present in the yolk nucleus of Balbiani area X 845.

Fig. 11. An oocyte where the mitochondria tend to surround the nucleus X 845.

Fig. 12. An oocyte where the mitochondria form a perinuclear ring X 845.

Fig. 13. An oocyte showing the medullary ring of mitochondria X 845.

Fig. 14. A stage showing the mitochondria evenly dispersed in the cytoplasm X 845.

Figs. 15-16. Regaud-Tupa preparation stained by Champy-Kull method.

Fig. 15. An oocyte where the mitochondrial ring is present in the medullary region of the egg X 1230.

Fig. 16. Well advanced oocyte, where the mitochondria are evenly dispersed in the cytoplasm and are in patches X 1230.

PLATE 2

Fig. 17. Bouin preparation stained with Mann's methyl blue eosine showing the entire ovary in which there are a number of oocytes. The smaller oocytes arranged about the periphery and the larger ones in deeper parts of the ovary X 75.

Figs. 18—20. Bouin preparations stained with Mann's methyl blue eosine showing the development of the follicle.

Fig. 18. A young oocyte in which the follicle is one-layered X 845.

Fig. 19. An older oocyte in which the follicle is double layered X 845.

- Fig. 20. A still older oocyte in which the follicle is many layered and consists of an outer layer invested by the connective tissue of the ovary and an inner layer closely investing the oocytes X 845.
- Figs. 21—24. Bouin preparation stained with Mann's methyl blue eosine.
- Fig. 21. A young oocyte with a large nucleus. The nucleus has been divided into four nucleoli X 845.
- Fig. 22. An oocyte where the nucleoli have just been extruded from the nucleus X 845.
- Fig. 23. An advanced oocyte. The large acidophilic nucleolus is seen on the nuclear membrane. It is vacuolated X 845.
- Fig. 24. An oocyte where there are a number of nucleoli. Some are seen passing out into the cytoplasm and lying partly on the nuclear membrane X 845.
- Fig. 25. A fairly advanced oocyte observed *intra vitam*. Golgi bodies are prominent and refractile; present in the form of vesicles and crescents with an osmiophilic rim and a central chromophobic portion. The larger bodies are the yolk bodies X 375.
- Fig. 26. An oocyte stained in neutral red for 20 minutes. Vacuome is present in the form of patches in close association with the Golgi bodies which are dispersed in the cytoplasm. The Golgi bodies are unaffected by neutral red X 375.
- Fig. 27. The same oocyte treated with 2 per cent osmic acid for 10 minutes. Golgi bodies become greyish with osmic. Vacuome unaffected X 375.
- Fig. 28. An oocyte stained with Sudan III. The Golgi yolk bodies are stained dark pink X 845.
- Fig. 29. An oocyte stained with Scharlach R. The Golgi yolk bodies are stained orange X 845.
- Fig. 30. A centrifuged oocyte fixed in Champy-Nassonov unstained. Two separate zones are visible. The lower mitochondrial zone and an upper containing Golgi bodies and associated Golgi yolk bodies X 1230.

Bibliography

1. Beams, H. W. ... Studies on the vacuome and Golgi apparatus in the acinar cells of the pancreas of rat 1930 a. Anat. Rec., Vol. 45.
2. Beams, H. W. ... Golgi apparatus, Canalicular apparatus Vacuome and mitochondria in the islets Langerhans of the Albino rat Anat. Rec., Vol. 46. 1930 B.
3. Beams, H. W. and J. B. Goldsmith Golgi bodies Vacuome and mitochondria in the salivary glands of the Chironomus larva. Jour. Morph. and Physiol., Vol. 55. 1929.
4. Bensley, R. R. ... On the nature of the canalicular apparatus of animal cells. Biol. Bull., Vol. 19.
5. Bhattacharya, D. R. ... Les inclusions cytoplasmique dan's l'oogenese de ceratin reptiles. These De Paris. 1925.
6. Ibid ... The Golgi apparatus and the vacuome theory. Allahabad University Studies, Vol. 3. 1927.
7. Bhattacharya, D. R. Golgi body and Vacuome. and Das, R. S. Nature. Nov. 2, 1929.
8. Bhattacharya, D. R., Das, R. S. and Dutta, S. K. On the infiltration of the Golgi bodies from the follicular epithelium to the egg. Zeit. fur. Zelif. Und. Mikro. Anato. Band. 8. Jan. 1929.
9. Bhattacharya, D. R. and Lal, K. B. Cytoplasmic inclusions in the oogenesis of certain Indian tortoises. Alld. Univ. Studies, Vol. 6. 1929, Sci. Sect.

10. Bhattacharya, P. R. .. On the infiltration of the Golgi bodies from the follicular epithelium to the egg in mammals. *Alld. Univ. Studies*, Vol. 7. 1931.
11. Bhattacharya, P. R. and Dutta, S. K. Vital staining experiment on *clarias batrachus*. *Alld. Univ. Studies*. Vol. 7. 1931.
12. Bhattacharya, P. R. ... Notes on the cell organs in the oogenesis of house gecko. *Alld. Univ. Studies*, Vol. 7. 1929 b.
13. Bhattia, D. R. and Nath, V. Studies on the origin of yolk Crustacean oogenesis. *Q. J. M. S.*, 1931. Part IV, Vol. 74. 1931.
14. Bowen, R. H. ... Methods for the demonstration of the Golgi apparatus. Parts 1—6. *Anat. Rec.*, 1928.
15. Bowen, R. H. ... Golgi apparatus and Vacuome, *Anat. Rec.*, Vol. 35. No. 4. 1927.
16. Brambell, F. W. R. ... The nature and origin of yolk. *Brit. Jour. Exptl. Biol.*, Vol. I, 1924.
17. Ibid ... The oogenesis of Fowl. *Phil. Transac. Roy. Soc. London*, 1925a.
18. Conklin, E. G. ... Effect of centrifugal force on the structure and development of the egg of *cupidula*. *Jour. Expl. Zool.* 22—311—420.
19. Cawdry, E. V. ... General Cytology. University of Chicago Press.
20. Ibid ... Special Cytology.
21. Dutta, S. K. and Asana, J. J. On the behaviour of Golgi apparatus in the oogenesis of *Calotes versicolor*. *Alld. Univ. Studies*, Vol. 4. 1928.

22. Das, R. S. ... Preliminary account of the Cytoplasm inclusions in the oogenesis of *Columba livia*. Alld. Univ. Studies, Vol. 4. 1928.
23. Das, R. S. ... Cytoplasmic inclusions in the oogenesis of birds (in press).
24. Gatenby, J. B. and Woodger, J. H. ... On the relationship between the formation of yolk mitochondria Golgi apparatus during oogenesis. Jour. Roy. Soc. Micros. Part II. 1920.
25. Gatenby, J. B. ... Cytoplasmic inclusions in the germ cells. The gametogenesis of *Saccocirrus*. Q.J.M.S., Vol 66. 1922.
26. Ibid ... Study of Golgi apparatus and vacuolar system of cavia, *Helix* and *Abraxas* by intravital method. Procs. Roy. Soc., B, Vol. 104. 1929.
27. Ibid ... Cell nomenclature. Jour. Roy. Micro. Soc., Vol. 50. 1930.
28. Ibid ... The Prozymogen granules of R. Bensley and the modern neutral red cytology. Amer. Jour. Anat., Vol. 48. 1931d.
29. Gatenby, J. B. and Cawdry, E. V. ... Microtomists Vade mecum.
30. Gatenby, J. B. ... Notes on the gametogenesis of *Ornithorhynchus paradoxus*. Q. J. M. S., 66. 1922. Part III.
31. Gatenby, J. B. and Hill, J. P. ... On an ovum of *Ornithorhynchus* exhibiting polar bodies and Polyspermy. Q. J. M. S., Sc. N. S., 69, Pt. 2. 229. 1924.
32. Harvey, L. A. ... Oogenesis of *Carcinus maenas* Penn with special reference to yolk formation. Trans. Roy. Soc., Edin., Vol. 56. 1929.

33. Hibbard Hope ... Oogenesis in certain Teleosts.
Trans. Roy. Soc., Edin., 56.
1929.
34. Hogben, L. T. ... Studies on Synopsis 1 and 2. Proc.
Roy. Soc., B., 91. 1920.
Pp. 268—305.
35. Hirschler, J. ... Uber die plasmakomponenten
(Golgi scher Appart Mitochon-
drien U. a der weiblichen Ges-
chlechtzellen` sytologische un-
tersuchungen am Ascidian
ovarium) Arch. f Mikr. Anat.,
89. (Abl. 2). 1917.
36. King, S. D. .. Oogenesis of Oniscus Asellus.
Proc. Roy. Soc., B., Vol. 100.
1926a.
37. Krjukowa, Z. ... Observations Cytologiques sur
les glandes salivaires de la larve
du chironome Arc. Russ d'anat
Hist. Embryol, T., 8. 1929.
38. Ludford, R. J. ... Further modification of the Osmic
Acid methods in the Cytologi-
cal technique, Ibid., Jan. 1926.
39. Ibid ... Vital staining of normal and
malignant cells III. Vital stain-
ing of Acinar cells of the
pancreas. Proc. Roy. Soc.,
B., Vol. 107. 1930.
40. Monterosso, B. ... Su L'origine la coaituzione dei
materiali deutoplasmici nell
'oocyte in accresciment dei
mammiferi. Arch. f. Zel-
forsch, 13. 530. 1915.
41. Moore, J. E. S. and On the maturation of the ovum
Tozer. F. in the Guinea pig. Proc. Roy.
Soc., B., Vol. 80. 285. 1908.
42. Narain, Dharam ... Cytoplasmic inclusions in oogen-
esis of ophiocephalus punctatus.
Zeit. Zelf. Bd. 2. 1930 B.

43. Narain, Dharam ... The oogenesis of *Bufo melanostictus*, *Rana tigrina* and *Rhacophorus fergusonii*. *Alld. Univ. Studies*, Vol. VI. 1930.
44. Nath, Vishwa .. Cell inclusions in the oogenesis of scorpion. *Proc. Roy. Soc., London*, B., 99, 44, 1925.
45. Ibid ... Studies on the origin of Yolk oogenesis of spider *Crossoprytchus lyons*. *Blackwell. Q. J.M.S.*, 72. 1928. Pp. 228—300.
46. Ibid ... Studies on the shape of Golgi apparatus (II). Observations on the fresh egg of the Indian earthworm *Pheretima posthuma*. *Q. J. M. S.*, 73, 1930.
47. Ibid ... On the present position of the Golgi apparatus and mitochondria. *Biol. Review*. Vol. 2. No. 1. Cambridge, 1926.
48. Ibid ... A demonstration of the Vacuome and Golgi apparatus as independent cytoplasmic components in the fresh eggs of the frog. *Zeit. Sc. tf.*, 1931.
49. Nath, Vishwa and Husain, T. Oogenesis of *Scolopendra*, *Q. J. M. S.*, 72, 403. 1928.
50. Nath, Vishwa and Mehta Oogenesis of fire-fly *Luciola*, *Q. J. M. S.* 1929. Vol. 73. Part 1.
51. Nath, V. and Mohan, P. Studies on the origin of yolk *periplaneta americana*. *Jour. Morph. and Physiol.* Vol. 48, No. 1. 1929.
52. Nath, V. and Nangia, M. D. A demonstration of the Vacuome and the Golgi apparatus as independent cytoplasmic constituents in the fresh eggs of teleostian fishes. *Jour. Morph. and Physiol.*, Vol. 52. 1931.

- houl, J. ... Recherches sur l'appareil endo cellulaire de Golgi dans les premières études de développement des mammifères. La Cellule, 37, 23.
- rat, M., Et. Painlevé, Constitution du cytoplasme d'une Cellule glandulaire la Cellule des glandes Salivaires de la larve du chironome C. R. Acad. Sci. T., 179. 1924a.
- id ... Observation vitale d'une Cellule glandulaire en activité. Nature et rôle de l'appareil réticulaire interne de Golgi et de l'appareil de Holmgren. Ibid. 1924 b.
- id ... Appareil réticulaire interne de Golgi trochosponge de Holmgren et Vacuome. Ibid. 1924 c.
- arat, M. ... Vacuome et appareil de Golgi. C. R. de L'association des anat., pp. 306—11.
- arat, M. ... 1926. A Sur la constitution de L'appareil de Golgi et de l'idiosome Vrais et faux dictyosomes C. R. de L'Acad. des Sci. Pp. CLXXXII, pp. 808-09.
- usso, A. ... Sui mutamenti che subiscono i mitochondria ed i materiali deutoplasmici dell' oocite di coniglia in diversi periodi di inanizione. Arch. f. Zellforsch., 5, 175, 1910.
- ao, C. R. N. ... On the structure of the ovary and ovarian ovum of Loris lydekkerianus. Q. J. M. S., Vol. 71. 1928.
- iovall, E. ... Ein Versuch das Binennetz Von Golgi Kopsch bei X der spermatogonienogenese zu homologisieren Anat. Anz., 28. 561. 1906.

62. Van der Stricht ... Etude comparee des ovules des mammiferes aux differentes periodes de laboratoire d'histologie et d'Embryologie de l'universite de Gand. Arch. de Biol., 33, 229. 1923.
63. Ibid. ... La structure de l'oeuf des mammifere (chauve Souris *Vesperugo noctual*) troisieme partie mem, Acad. Roy. Belgique. Bruxelles 2e Ser, 2. 1. 1909.
64. Voinov, D. ... La Vacuome et l'apparat de Golgi dans les cellules genitales males de *Notonecta glauca*. Arch. de Zool. Exper. T., 67. 1927.
65. Wilson, J. T. and Hill, J. P. Observations on the development of *ornithorhynchus*. Phil. Trans. Roy. Soc., 199, b. 31, 1908.
66. Wilson, E. B. ... The cell in development and heredity. Macmillan and Co., 1928.
67. Weiner, P. ... Contributions a l'etude des noyaux Vitellins (*Tegenaria Lithobius*, Pl. IV, et v).
-